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Sociodemographic and Health-Related Risks for Loneliness and Outcome Differences by
Loneliness Status in a Sample of Older U.S. Adults

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Dissertation submitted to the
School of Nursing
at West Virginia University
in partial fulfillment of the requirements for the degree of

Doctor of Philosophy
in
Nursing

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2007

Key words: loneliness, older adults, geriatrics, HRS
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BACKGROUND: Loneliness is a prevalent problem for older adults and has been shown to be associated with negative physical, psychological, and social variables. There has been limited research focusing on the relationship of loneliness to health. There is a gap in the literature when it comes to understanding how the problem of loneliness relates to the health of older adults in the United States.

PURPOSE: The purpose of this study was to address this gap in the literature through the testing of two models, the first model represented the postulated risks for loneliness and the second model represented the postulated outcomes for those who experience loneliness. Variables were chosen for inclusion in the models based on a review of pertinent quantitative and qualitative literature.

METHODS: The models were tested using a representative sample of U.S. older adults. Data analysis was performed using data from the 2002 and 2004 waves of the Health and Retirement Study. The sample was limited to respondents aged 50 and older who participated in wave 6 (2002) and wave 7 (2004) without proxy, answered the lonely question at both waves, were community-dwelling in 2002 and who had complete data on selected variables in the model. Univariate and bivariate analyses were followed by logistic regression analysis to identify risks. One-way ANOVAs, comparative means testing and independent analysis of covariance tests were used to evaluate the difference in outcomes for those who were never lonely, briefly lonely, or chronically lonely.

RESULTS: Non-married status was consistently the primary predictor of self-report of loneliness, followed by poorer self-report of health status, lower educational level, functional impairment, increasing number of chronic illnesses, younger age, lower income, and less people living in the household. Gender and use of home care were not significant predictors of loneliness. Those who were chronically lonely reported less exercise, more tobacco use, less alcohol use, a greater increase in number of chronic illnesses, higher depression scores, more physician contacts and greater average number of nights in a nursing home than those who were never lonely or briefly lonely. After controlling for significant covariates of loneliness, those who were chronically lonely did not have significantly more physician contacts.

DISCUSSION: Loneliness is a prevalent problem for older adults in the United States with its own unique health-related risks and outcomes. Given the prevalence, it should be considered a healthcare priority in the United States. Based on the results of this study, inclusion of loneliness and loneliness risk screening as part of routine health histories for those aged 50 and over should be considered. Future research needs to focus on evaluating the effectiveness of both prevention and treatment interventions for loneliness to provide empirical data to guide evidenced based practice.

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DEDICATION

I dedicate this work to my mother, Betty Lou Winner and to my grandmothers, Jennie Hotchkiss Preston (1912-1989) and Mary Kathleen Winner (1903-2004), all three of whom spent countless hours caring for others, both young and old. They set an example for me throughout my life of how important it is to recognize the needs of others and act on this recognition. As a result, they have made me a better woman, mother, and nurse.

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CHAPTER 1: INTRODUCTION

This research project tested two models, a model of sociodemographic and health-related risks for loneliness and a model of outcomes potentially associated with loneliness using a sample of United States residents, aged 50 and older. The models were derived from the social science and healthcare literature. This first chapter presents the background of the study, states the problem and explains the professional significance of the research problem. It also presents the conceptual framework for the study and a brief overview of the methodology used for the analysis.

Background

Historically, loneliness has been conceptualized as an emotional or social problem (DeJong-Gierveld, Kamphuis, & Dykstra, 1987) as well as a psychological problem that is derived from deprivation of some social or emotional need (Peplau, 1955). Loneliness has sometimes been considered a concept that is imbedded with other problems such as depression, anger, and self-isolating behavior. However, most recently it has been shown that loneliness is a separate psychological construct from depression (Cacioppo, Hughes, Waite, Hawkley, & Thisted, 2006). Due to these varied conceptualizations, researchers have tried to measure and understand loneliness as an emotional, psychological, or social problem. Limited emphasis has been placed on understanding the health related risks or negative health outcomes associated with loneliness. Since loneliness is a psychological construct separate from depression, it is reasonable that loneliness may have its own unique health-related risks and outcomes.

Why study the problem of loneliness with U.S. older adults?

Understanding how loneliness influences the health of the older adult population in the United States is important for several reasons. Loneliness is consistently reported as a negative

experience associated with physical, psychological, and social problems (Berg, Mellstrom, Persson, & Svanborg, 1981). It has been associated with poor quality of life (Ekwall, Sivberg, & Hallberg, 2006) and it has been shown to be an important predictor for depression in this age group (Cacioppo et al., 2006). Unfortunately, the majority of research on loneliness with older adult samples has taken place in countries other than the United States. In Sweden, studies report that loneliness is a pervasive problem with a prevalence reported to be as high as 38% for older women (Holmen, Ericsson, Andersson, & Winblad, 1992). With the increase in life expectancy and the aging of the baby boomer generation, there will be an increased number of older adults requiring care in the United States (Arnone, 2006). Understanding what influences the health and function of this group is essential so that both healthcare providers and policymakers can appropriately meet their needs.

Studying the problem of loneliness among an older population in the United States is important because culture does have some effect on the mental health of an individual (Basic Behavioral Science Task Force of the National Advisory Mental Health Council, 1996). Triandis (1996) explains that culture consists of many shared elements that give an individual standards for "perceiving, believing, evaluating, communicating, and acting among those who share a language, a historic period, and a geographic location" (p.408) Five different studies have reported that cultural experiences significantly contributed to the antecedents for, experience of, and coping strategies for loneliness (Rokach, 1996; Rokach, 1999; Rokach, Moya, Orzeck, & Esposito, 2001, Rokach & Neto, 2005; Rokach, Orzeck, & Neto, 2004). Research conducted in non-western cultures is not always congruent with the psychology of western cultures (Triandis, 1996).

Research that improves the knowledge base of health-related risks for loneliness as well as identifies outcomes that may be associated with loneliness for older adults in the United States will be of value to those who care for this population. Fourteen U.S. studies, each with state-specific samples, have demonstrated that loneliness is a significant problem and is associated with a stress response, poor subjective health, lack of friends, poor quality in relationships, hypertension, and malnutrition (Adam, Hawkley, Kudielka, & Cacioppo, 2006; Barbour, 1993; Cacioppo et. al., 2002; Mullins & Elston, 1996; Walker & Beauchene, 1991). While these studies do give information about some specific health-related correlates of loneliness, the results are not comprehensive regarding prevalence, risks, and outcomes and are not generalizable to the U.S. population.

Expanding what is known about the health effects of loneliness is be consistent with the most recent research priorities set forth by the National Institute on Aging which have put increasing emphasis on understanding mind-body interaction as well as sociobehavioral issues for the elderly (<http://www.nia.nih.gov/AboutNIA/StrategicPlan/ResearchGoalA/>). This research about specific health-related risks for loneliness and negative outcomes associated with loneliness will provide target areas for providers who are planning both primary prevention or treatment interventions. Additionally, the results provide important information to healthcare administrators who are developing policies related to benefits, recommended screenings, and reimbursable treatments for older adults.

Why nurses should study loneliness in older adults

The problem of loneliness has been considered part of the nursing knowledge base since the writings of Hildegard Peplau in 1955. Peplau focused mainly on the psychological component of loneliness and based her definition of loneliness on Maslow's theory of human

needs, specifically in relation to the belongingness need described by Maslow (Maslow, 1954). Peplau described loneliness as a “feeling of unexplained dread, of desperation, or of extreme restlessness” (Peplau, 1955, p. 1476) and she recognized the problem of loneliness as an important area for nursing interventions. In the 1980s loneliness was linked to physical symptoms and poor subjective health in older adults (Berg et. al., 1981) and a path model was introduced to the nursing literature indicating that loneliness was the strongest of several social risk factors relating to perceived health (Cox, Spiro & Sullivan, 1988). In the 1990s, it was suggested that nurses set a research agenda to study how loneliness affects the health of the older adult (Donaldson & Watson, 1996). However, since that time, most loneliness research has continued to be descriptive or exploratory in nature without the presentation of new nursing models of loneliness or nursing interventions for loneliness.

Problem Statement

There is a gap in the literature when it comes to actually understanding how the problem of loneliness relates to the health of older adults in the United States. The purpose of this study is to address this gap by focusing on both the health-related risks for loneliness and the outcome differences for those who are lonely using a representative sample of United States residents aged 50 and over.

Professional Significance of this Study

This study contributes to the science and practice of nursing in three areas, theory development, practice utility, and health policy development. The results from this study will lead to ongoing theory development about loneliness and health. These study results will give a generalizable picture of the prevalence of loneliness for those adults over 50 living in the United States. Results from this study will improve understanding of what contributes to loneliness as

well as how loneliness might be associated with negative health behaviors and poor health outcomes for older adults. Loneliness elicits a physical stress response (Adam et. al., 2006; Kiecolt-Glaser, Ricker, George, Messick, Speicher, Garner, 1984)., is a predictor of depression (Cacioppo et al., 2006), and has a strong negative influence on positive health practices (Yarcheski, Mahon, Yarcheski, & Cannella, 2004). Understanding the risks for loneliness as well as the outcome differences for those who suffer loneliness will enhance the evidence base for development of practice interventions by providing information about specific areas to target for both prevention and treatment interventions. Currently, there are no health policies that recommend assessing or screening older adults for loneliness. There are also no well-studied and reimbursable interventions for loneliness. Results from this study provide evidence about the importance of screening as well as provide evidence for policymakers who regulate reimbursable treatments.

Overview of Methodology

This study was conducted through data analysis from multiple waves of the Health and Retirement Study. The Health and Retirement Study (HRS) started in 1992 and is an ongoing national data collection effort that has been funded by the National Institute on Aging. The sample from the Health and Retirement Study is unique in that it is a random and representative sample of U.S. adults aged 50 and over. The HRS survey data includes variables that relate to health, retirement issues, and economic issues of older adults. To accomplish the current analyses, univariate and bivariate exploratory and descriptive analyses were performed for each wave of data. To assess predictors, logistic regression analysis was performed. Further analyses included one-way ANOVAs, comparative means testing and analysis of covariance tests to

evaluate the differences in outcomes for those who were never lonely, briefly lonely, or chronically lonely.

Conceptual Framework for Study

Conceptualization of Loneliness

It is an inherent need for human beings to socialize and belong. The belongingness need was placed third on the hierarchy of human needs, following immediate physical and safety needs (Maslow, 1954). The belongingness need is so important that humans will sometimes sacrifice basic needs such as their physical needs or safety needs in an effort to meet this need (Lauder, Sharkey, & Mummery, 2004). It has been theorized that loneliness is the result of an unmet belonging need (Hagerty, Patusky, Bouwsema, & Collier, 1992).

Loneliness has been defined in multiple ways in the healthcare and social science literature. For the purposes of this study, loneliness is conceptualized according to Peplau and Perlman's (1982) sourcebook on loneliness as "the unpleasant experience that occurs when a person's network of social relations is deficient in some important way, either quantitatively or qualitatively" (p.4). Peplau and Perlman's conceptualization of loneliness involved a complex conceptual analytic process of evaluating at least 12 other frameworks of loneliness that are cited in Peplau's (1982) book. Their definition is a rather simple reflection of loneliness but speaks to the unique nature of loneliness as the person's perceiving some important deficiency. It addresses the issue of quantity versus quality that has been prevalent in the loneliness literature. Peplau also concludes that loneliness is unpleasant indicating that the problem of loneliness is not associated with good feelings and is therefore a stressor to the individual. By defining loneliness as a deprivation, it implies that there is an unmet need and that the person is aware of the unmet need. Peplau (1982) further explains that the individual will react in various ways to meet the perceived unmet need as well as try to cope with the deprivation (Peplau & Perlman, 1982).

Betty Neuman's System Theory

The Neuman Systems Model serves as the theoretical nursing base for this study. The Neuman Systems Model was originally developed in 1970 at the University of California, Los Angeles, by Betty Neuman, Ph.D., RN. Dr. Neuman developed the model in an effort to provide a wholistic overview of the physiological, psychological, sociocultural, and developmental aspects of human beings (Neuman & Young, 1972). The Neuman model was chosen because of its wholistic perspective and extensive use in stress studies (Skalski, DiGerolamo, & Gigliotti, 2006). The model is pictured in Figure 1 (Neuman & Fawcett, 2002).

Neuman's model was influenced by systems theory, adaptation theories and stress theory (Neuman et al., 2002). Neuman's model postulates that each human being has three different interrelated lines of defense against assaults on the person's system: the flexible line of defense, the normal line of defense, and the lines of resistance. In the Neuman Systems Model, the flexible line of defense keeps the person well and unaffected by stressors, the normal line of defense takes into account the individual's experiences over time and reflects the person's ability to maintain stability, and the lines of resistance represent internal factors that help to return the person to a stable state when they have developed negative affects from a stressor (Fawcett, 2000).

Neuman's model is congruent with Hildegard Peplau's original conceptualization of loneliness as a stressor that impacts a person's health. Peplau (1955) reported that "true loneliness is so painful that the patient has to hide it, disguise it, defend himself against it. His defenses are what the nurse must deal with as she helps him to learn how to live productively with people" (p.1476). Neuman and Peplau both agree that nurses can target interventions toward strengthening a client's defenses against stressors.

For the purposes of this research, loneliness is considered a stressor for the individual. Individuals may strengthen flexible and normal lines of defense by implementing preventive measures or through appropriate coping mechanisms. If the flexible lines of defense are penetrated, then the person may experience loneliness. If the normal lines of defense are strong, then the person can return themselves to a stable state. If the normal lines are weak, then the person may not be able to return themselves to a stable state and may eventually experience a negative outcome associated with loneliness. Experiencing a negative outcome may lead the person to seek treatment.

Figure 1: Neuman's systems model (Neuman, 2002, p. 24)

The loneliness models to be tested are shown in Figures 2 and 3. Figure 2 represents the postulated risks for loneliness and Figure 3 represents the potential outcomes for those who are lonely. This model was derived from the literature review and is a representation of what has been reported in prior studies.

Figure 2. Model of postulated sociodemographic and health-related risks for loneliness.

Figure 3. Model of postulated health-related outcomes associated with loneliness

Limitations

There primary limitation to this study is that it is a secondary data analysis and that all of the variables were self-reported. Due to the nature of the variables reflecting personal perception, this project excluded respondents who used proxies. Data used for secondary analysis may not have been collected for the purposes of the researcher who performs secondary analysis. Though the data used for the current analysis is from a reputable organization, there is still the chance that there were errors throughout the process of survey development, question formation, data collection or data entry which may not be obvious when using the dataset. The use of secondary data may offer the convenience of large random samples but it also constrains the scholar's ability to answer research questions with the existing variables which may be imperfect. The large sample sizes available from survey data can give significant results that may not be present with smaller samples (Leslie & Beyea, 1999).

The second limitation is the dichotomous measure of loneliness. Loneliness is a personal perception that is based not only on what the individual experiences but also on what the individual needs. This requires some self-evaluation which may lead to the conclusion that self-report may be the most valid measure of loneliness. One most recent literature review regarding the clinical significance of loneliness concluded that self-report may be the most "tenable method of data collection" (Heinrich & Gullone, 2006). While simple self-report of loneliness does not elaborate on specific emotional, social or psychological characteristics that each participant associates with loneliness, it is still a valid measure of loneliness. Since this research is not a descriptive study of loneliness, this dichotomous self-report measure of loneliness served the purpose of this study well.

Self-report of loneliness has been shown to correlate highly with the two most widely used loneliness assessment tools, the UCLA loneliness scale (Russell, 1982) and the DeJong Gierveld Loneliness Scale (Van Baarsen, 2001). Peplau (1982) first reported about the Abbreviated Loneliness Scale (ABLS) that included 7 questions, 2 of which were self-report questions about feeling lonely. The ABLS was found to correlate in a positive direction with the UCLA scale ($r = .86$, $p < .001$) (Paloutzian & Ellison, 1982). Self-report was the original standard against which the original UCLA instrument was validated (Russell, Peplau, & Ferguson, 1978) and self-report continues to be used in today's research to establish validity of instruments (Hughes, Waite, Hawkley, & Cacioppo, 2004). In the development of the widely used UCLA loneliness scale, the clinical sample was derived from people who self-reported loneliness and the UCLA scale itself correlates very highly ($r = 0.79$, $p < .001$) with self-report of "feeling lonely" (Russell, Peplau, & Ferguson, 1978). These correlations imply a mutual relationship between self-report of loneliness and multiple versions of the UCLA loneliness Scale. When assessing emotional loneliness, the DeJong scale was reported to correlate highly with two self-labeling loneliness items, a negatively worded item ($r = 0.67$, $p < 0.01$) and a neutral item ($r = 0.65$, $p < 0.01$).

Since the initial development of the UCLA scale, multiple shorter versions of the UCLA scale have been evaluated. A 3-item scale derived from the UCLA scale has also been studied using a sub-sample of 2182 respondents from the 2002 wave of the HRS. The 3-items focused on the perception of lacking companionship, feeling left out, and feeling isolated. The 3-item scale was tested using a sample of 229 seniors and the results correlated highly with the UCLA loneliness scale ($r = .82$, $p < 0.001$) (Hughes, et al., 2004). Hughes (2004) further reported that the scores from the 3-item UCLA scale correlated highest with the self-labeling loneliness item on

the Center for Epidemiological Studies depression scale ($r=.49$, $p<0.001$) for the Health and Retirement Study sample, and for a second sample from the Chicago Health, Aging, and Social Relations Study ($r=.54$, $p<0.01$). The fact that this self-labeling item has remained on the CESD as a valid measure of loneliness further contributes to the reliability of this item. This self-labeling item is the item that was used for this research.

The following chapters include the literature review, discussion of methodology, data analyses for model testing, presentation of statistical results, and, discussion of conclusions, clinical practice implications, and recommendations for future research. The significance of the problem of loneliness is evident in the literature review in Chapter 2. Chapter 3 details the methodology, Chapter 4 presents the statistical results and Chapter 5 provides a discussion of these results as they relate to the reviewed literature. Additionally, Chapter 5 provides a discussion of implications of the study findings as well as suggestions for future research. Overall, this study provides further support that loneliness is a prevalent problem for older adults in the United States. Results also support that there are significant differences in health outcomes for those who are chronically lonely when compared to those who are never lonely or only briefly lonely.

CHAPTER 2: LITERATURE REVIEW

Theoretical Review

According to Peplau and Perlman (1982), loneliness has been viewed from eight different theoretical perspectives. These eight categories include psychodynamic, phenomenological, existential-humanistic, sociological, interactionist, cognitive, privacy, and systems theory. Peplau and Perlman (1982) identify that when the theories are evaluated for completeness and stimulation of research, the most developed theories are those critiqued as psychodynamic or cognitive-based theories. For this reason these two types of theories are presented as a theoretical review of loneliness.

A Psychodynamic Theory of Loneliness

Leiderman's (1980) psychodynamic theory of loneliness emphasizes that loneliness is a separate psychological construct that can be part of multiple psychiatric syndromes like depression, phobias, and psychoneuroses. He developed his theory through review of past psychodynamic theories (Fromm-Reichman, 1959; Zilboorg, 1938) along with analyses of case studies. Zilboorg's (1938) theory is reported as the first psychoanalytic exploration on the subject of loneliness where loneliness was described as relating back to childhood attachment issues and resulting in an overwhelming persistent negative experience (Perlman & Peplau, 1982). The main component of this Leiderman's psychodynamic theory of loneliness is that the individual lacks self-object differentiation. In other words, loneliness is linked back to difficulties in recognizing what part of the ego is self and what part is parent (Leiderman, 1969). This psychodynamic theory does not address the health-related problems of loneliness.

A Cognitive Theory of Loneliness

Peplau, Miceli, and Morash (1982) developed a cognitive theory of loneliness that describes cognition as a mediator between a perceived deficit and the experience of loneliness. This cognitive theory relates directly to Peplau's definition of loneliness as she postulates that an individual must perceive some form of discrepancy between what they need or desire and what they experience. Peplau and colleagues (1982) report that those who self-label as being lonely make this conclusion after evaluating affective, behavioral, and cognitive cues. These cues are cognitively interpreted and evaluated along with social comparisons as to what is perceived as the norm for relationships before leading to the perception of loneliness (Peplau, Miceli, & Morash, 1982). This cognitive theory supports that the experience of loneliness is a personal perception and that it depends both on level of need, meeting of needs, and social norms.

Empirical Literature Review

Literature Search Process

The literature was reviewed from 1980 to 2007, for research articles that were available in English, directly related to loneliness, and included community-dwelling older adults in the study sample. After review, fifty-four articles were identified as primary research articles for inclusion; forty-nine are quantitative and five are qualitative.

Quantitative Studies

The quantitative studies have been synthesized and are presented conceptually, expressing age and gender issues relating to loneliness. Additionally, physical, psychological, and social correlates of loneliness for older adults are presented. Finally, the literature has been reviewed for health-related risks for loneliness as well as negative health behaviors or negative

health outcomes associated with loneliness. The literature is also presented chronologically in Appendix A, Table 1.

Age and Loneliness

There have been discrepant results regarding the relationship of age and loneliness. Four studies reported age correlates with loneliness. Holmen (1999) studied 1725 Swedish older adults and concluded that the prevalence of loneliness increased with advancing age up until age ninety years. This could be because the old-old age group is likely to have more social contacts from caregivers. Dykstra (2005) concluded that not only is advancing age associated with increasing loneliness, but that increases in loneliness are highest for the oldest adults. Dykstra's report is slightly different than Holmen who reported that there was a leveling off of loneliness at age 90. Lauder (2004) studied an Australian sample and reported that age was not significantly correlated with loneliness.

Not only is it theorized that age is a correlate of loneliness, but Rokach and Brock (1997) have found that the experience of loneliness changes as a person ages and that the positive effects of loneliness, such as having time for personal reflection or development, are not as prevalent in older adults. Rokach and colleagues (2004) also report that a person's ability to cope with loneliness changes as a person ages. These studies demonstrate that advancing age may increase risk for loneliness, change the experience of loneliness, and diminish the ability to cope with loneliness.

Gender and Loneliness

Research studies have established that the occurrence and experience of loneliness may vary by gender. The United States is a male-oriented culture with high differentiation among gender roles in the older generations (Stevens & Westerhof, 2006). Additionally, gender, in

many societies, is related to inequalities in socioeconomic status, power, roles, and politics (Ballantyne, 1999). Since people are “gender socialized”, it is possible that women settle into roles that will greatly impact their life course (Ballantyne, 1999). Consequently, older women in the U.S. may have foregone educational or employment opportunities during their younger years and, as a result, are more likely to suffer from some of the risks of loneliness, including poverty or low education, in their later years. Since women have a longer life expectancy, they are more likely to experience widowhood, live alone and thereby have fewer social contacts. The prevalence of loneliness has been reported as being higher for older women (Berg et al., 1981; Holmen et al., 1992). Two additional studies reported that women experience loneliness differently than men, with men having less physical or psychosomatic symptoms. Currently, the causal relationship between gender and loneliness with U.S. older adults remains unclear.

Physical Correlates of Loneliness

Numerous studies have shown that loneliness has a varied negative relationship with physical health although the causal relationship has not been fully established. Physical correlates have included poor perceived health, (Berg et al., 1981; Dykstra, Van Tilburg, & DeJong Gierveld, 2005; Holmen et al., 1992) vague physical symptoms, (Berg et al., 1981; Cacioppo et al., 2002) cardiovascular problems, (Andersson, 1985; Cacioppo et al., 2002; Sorkin, rook, & Lu, 2002) malnutrition (Walker & beauchene, 1991; Wylie, Copeman, & Kirk, 1999) and sleep disturbance (Berg et al., 1981; Caciopo et al., 2002).

Studies describing the relationship between functional status and loneliness have had conflicting results. Multiple studies have reported that declining physical function is related to a higher report of loneliness (Dykstra et al., 2005; Kim, 1999; Pinquart, 2003). However, those who need assistance with transfers or toileting have been shown to report less loneliness

(Bondevik & Skogstad, 1998). One possible explanation of this could be that the nature of the impairment requires frequent contact with caregivers. Dykstra (2005) reported that differences in function did not account for differences in loneliness. Most recently loneliness has also been associated with lower cognitive function and more rapid cognitive decline (Wilson, Krueger, Arnold, Schneider, Kelly, & Barnes, 2007)).

Loneliness has been related to diminished immunocompetency and physical stress response. Kiecolt-Glaser (1984) reported a significant association between high loneliness and lower natural killer cells and between high loneliness and higher urinary cortisol. Subsequent studies have also shown that prior day self-report of feeling lonely, sad, threatened or lacking control is associated with next-day elevation in cortisol levels (Adam et al., 2006). These results support the findings of several studies that reported a link between loneliness and increased risk for the common cold (Cohen, Doyle, Skoner, Rubin, & Gwaltney, 1997), increased risk for myocardial infarction (Orth-Gomer, Unden, & Edwards, 1988), and decreased likelihood for survival after myocardial infarction (Berkman, Leo-Summers, & Horwitz, 1992). Berkman and colleagues (1992) studied 194 myocardial inpatients over the age of 65 from New Haven, Connecticut and reported that post-MI patients who lacked emotional support were 2.9 times more likely to suffer 6-month mortality than those who had support.

Lack of social support has also been related to loneliness. Low levels of emotional support and companionship correlate with more loneliness (Sorkin et al., 2002; Yeh & Io, 2004). Conversely, Stevens and Westerhof (2006) were able to show that both older men and women report that maintaining relationships outside the marriage contribute to allaying loneliness. Dykstra (2005) reports similar findings that ongoing involvement in a social network as a person

ages may be protective against loneliness. From this review, it can be interpreted that loneliness may have a significant and lasting effect on physical health.

Psychological Correlates of Loneliness

Serious psychological symptoms have been shown to relate to loneliness. Five studies report that actual depression or depressive symptoms have been positively correlated with loneliness (Alpass & Neville, 1003; Andersson & Stevens, 1993; barbour, 1992; Berg et al., 1981, Cacioppo et al., 2006; Larson, Zuzanek, & Mannell, 1985). One mixed-methods study reported that loneliness in the week prior to the interview was associated with depressive symptoms, anxiety, and hopelessness (Barg, Huss-Ashmore, Wittink, Murray, Bogner, & Gallo, 2006). Three additional studies reported anxiety as being correlated with loneliness (Berg et al., 1981; Cacioppo et al., 2002; Rokach & Brock, 1997), and three studies reported that loneliness was positively correlated with cognitive impairment or difficulty concentrating (Berg et al., 1981; Holmen et al., 1992; Wilson et al., 2007).

Longitudinal analysis of data from the survey, Established Population for Epidemiologic Studies of the Elderly in New Haven (2006), revealed that social engagement was shown to decrease depressive symptoms but only in a specific group who had scores below sixteen on the 20-item Center for Epidemiologic Studies Depression Scale (CESD). In other words, social engagement was seen to be associated with fewer depressed symptoms but only in those who were not depressed at baseline (Glass, De Leon, Bassuk, & Berkman, 2006).

Social Correlates of Loneliness

Numerous studies revealed eight different negative social correlates of loneliness including low socioeconomic status, low education, widowhood, low number of social contacts, low number of friends, lack of religious affiliation, domestic violence, and drug use (Andersson,

1985; Andersson et al., 1993; Barbour, 1993; Berg et al., 1981, Dykstra et al., 2005, Hector-Taylor & Adams, 1996, Holmen et al., 1992; Larson et al., 1985; Lauder, Sharkey, & Mummery, 2004; Moorer & Suurmeijer, 2001; Mullins & Elston, 1996; Pinqart, 2003; Rokach, 1997; Rokach, 2000; Rokach, 1996; Rokach et al., 1997; Thaubertger, 1981; Van Baarsen, 2001; Van Tilburg, Havens, & DeJong, 2004; Walker et al., 1991; Yeh et al., 2004). Marital status is an important contributor to loneliness and Barbour (1993) reports that low levels of intimacy in a marriage correlated with loneliness. In the process of his research, Berg (1981) was also able to show that loneliness was not related to dwelling type, employment type, or social club membership.

There is some conflict in the literature about whether quantity or quality of social relationships is more important in allaying loneliness for older adults. Bondevik (1998) reported that high numbers of social contacts correlated negatively with loneliness. Nezlek and colleagues (2002) included two measures of loneliness in their measures of well-being and reported that for their older adult sample, quantity of interaction was more important than quality in determining well-being. One study reports that internet access may have a psychosocial benefit for older adults and demonstrates that access to the internet results in less loneliness and less depression (White et. al., 2002). For those who are married, quality of spousal interaction was important to well-being but for the married and unmarried alike, over all quantity of social contacts was related to psychological well-being (Nezlek, Richardson, Green, & Schatten-Jones, 2002).

Predictors of Loneliness

Nine studies from outside the United States and one study from the United States reported predictors of loneliness. Pinqart (2003) examined a sample of 4043 older German adults for predictors of loneliness specifically related to marital status. His results show that

increased social contact was more likely to diminish loneliness in unmarried adults and that better functional status related to less loneliness in divorced, widowed, and those who had never-married (Pinquart, 2003). Victor, Scambler, Bond & Bowling (2000) identified six vulnerability factors in their study including marital status, increased loneliness over the past 10 years, increased time alone, poorer mental health as measured by the General Health Questionnaire, poor current health, and poorer than expected health. Fry and Debats (2002) reported that poor self-efficacy beliefs are a strong predictor of loneliness. They also report that self-efficacy varies by gender and that women tended to have stronger self-efficacy beliefs.

Four studies reported that social factors were the main contributors to loneliness. Lauder (2004) studied an Australian sample, aged 18 and older with a mean age of 45 years, and concluded that domestic violence, unemployment, unmarried or unpartnered status and number of children living in the home were predictive of loneliness. Kim (1999) studied Korean women living in the U.S. and reported that the level of satisfaction of social support, along with network size, ethnic attachment, and functional status were predictive of loneliness. In her study, satisfaction with support was the largest predictor and marital status was not predictive of loneliness (Kim, 1999). Similar to the aforementioned studies, Tilburg reported that household composition and lack of participation in social and personal relationships were predictive of loneliness (Tilburg, Gierveld, Leccini, & Marsiglia, 1998). Hector-Taylor and colleagues (1996) reported on a sample of older adults from New Zealand that being widowed or divorced, not belonging to a group, living alone, lower education and less income were predictive of loneliness.

Poor health associated with aging may also be a predictor of loneliness. Dykstra (2005) reported that declining health is predictive of loneliness and conversely, that improved health

results in less loneliness over time. Overall, Dykstra (2005) concludes that health as a predictor for loneliness becomes weaker as a person ages. Similar results are reported from a Finnish study regarding the occurrence of illness as being predictive of loneliness (Savikko, Routasalo, Tilvis, Strandbert, & Pitkala, 2005). Tilburg (1998) and Victor and colleagues (2005) also found that poor health and increased time alone are predictive of self-report of loneliness (Victor, Scambler, Bowling, & Bond, 2005).

Cohen-Mansfield and Parpura-Gill (2007) tested a theoretical model of loneliness for environmental and psychosocial predictors of loneliness. For their study, the 19-item UCLA scale was used with a sample of 161 older adults from Maryland living in low-income buildings. Using path analysis, the results concluded that low-income (respondents who self-reported that they did not have enough money), number of social contacts, functional status, and financial resources were predictive of loneliness. These authors further report that their model for loneliness and depression explained 42% of the variance in loneliness and 47% of the variance in depressed affect (Cohen-Mansfield & Parpura-Gill, 2007). This study had significant limitations of sample size and sample bias since the entire sample lived in one "low-income" housing complex.

Loneliness and Negative Health Behaviors

Loneliness has been shown to be predictive of negative health behaviors and related to a decrease in positive health practices. Lauder (2006) examined a sample of Australian adults who were divided into lonely versus non-lonely categories, and then evaluated for the specific health behaviors of smoking, sedentary lifestyle, and obesity. The lonely adults were found to be more likely to smoke cigarettes than their non-lonely counterparts (Lauder, Mummery, Jones, & Caperchione, 2006). Lauder also reported that although there was no difference in sedentary

behavior between the lonely and non-lonely, the lonely adults were more likely to be overweight even when controlling for gender, employment, marital status, age, and income (Lauder et al., 2006). Yarcheski (2004) was able to show through a meta-analysis of 37 studies that loneliness was a strong negative influence on positive health practices.

Loneliness has been shown to be predictive of more frequent use of the healthcare system. Geller (1999) completed a study of emergency department patients and found that loneliness was predictive of more frequent use of the emergency department even when controlling for chronically illness. It was also reported in three other studies that there is a positive relationship between loneliness and frequency of health care visits (Berg et al., 1981; Ellaway, Wook, & Macintyre, 1999; Lauder et al., 2004). Even more costly is the finding that those who are lonely are more likely to enter a nursing home, and they are more likely to enter a nursing home sooner than their non-lonely counterparts (Russell, Cutrona, De La Mora, & Wallace, 1997). Russell and colleagues (1997) specify that it is unclear whether the link between loneliness and poor mental and physical health is explanatory of this finding and acknowledge that it is possible that loneliness is the consequence of poor health. They also speculate that older adults perceive that they will have more socialization and less loneliness in the nursing home. Unfortunately, Dykstra (2005) has reported that there is no decrease in loneliness after admission to residential care.

Loneliness and Negative Health Outcomes

Loneliness is predictive of negative psychological outcomes. Loneliness has been reported as the most important predictor of psychological distress in a sample of 999 British older adults (Paul, Ayiss, & Ebrahim, 2006). It is possible that loneliness causes so much distress that it leads to depression. Three studies reported that loneliness is predictive of depression

(Alpass et al., 2003); Cacioppo et al., 2006; Cohen-Mansfield et al., 2007). Cohen-Mansfield and Parpura-Gill (2007) recommended that loneliness be targeted for cognitive intervention because it was the strongest predictor for depression in their study.

One study of loneliness with a sample of Swedish older adults and their caregivers reports that loneliness was the most important factor predicting quality of life (Ekwall et al., 2006). Understanding the mechanism of the link between loneliness and physical problems has been explored. Depression has been linked to greater catecholamine stress responses in a sample of younger women (Light, Kothandapani, & Allen, 1998). It may be through this mechanism that loneliness contributes to hypertension (Cacioppo et al., 2002; Tomaka, Thompson, & Palacios, 2006) and coronary disease (Lynch & Covey, 1979; Tomaka et al., 2006). Cacioppo (2002) was able to show that loneliness is associated with an increase in total peripheral resistance that has been linked to chronic hypertension. Chronic hypertension may cause difficulties with endothelial function leading to more atherosclerosis (Strike & Steptoe, 2004).

Depression and social isolation have both been linked to increased fibrinogen in older adult samples (Kop, Gottdiener, & Tangen, 2002; Orth-Gomer et al., 1988). Tomaka and colleagues (2006) studied a Caucasian and Hispanic sample, aged sixty to ninety-two years (mean age 71 years), and reported that loneliness was predictive of stroke in the older Hispanic sample. This finding may be related to increased fibrinogen levels which promotes clotting. In addition to vascular problems, loneliness has been reported as a predictor of Alzheimer's disease (Wilson, et al., 2007).

Loneliness as a predictor of negative health outcomes may not be consistent in cultural comparisons. Tomaka and colleagues (2006) compared their Caucasian and Hispanic samples and reported that loneliness was more predictive of disease states in the Hispanic sample. They

also reported that belonging support was protective as a predictor for diabetes and hypertension. These findings indicate that Hispanics who feel a sense of belonging may diminish their risk for these two illnesses (Tomaka et al., 2006).

Qualitative Studies

There have been a limited number of qualitative studies relating to loneliness in older women, particularly older women who live in the United States. The qualitative studies are reported conceptually and then chronologically in Appendix A, Table 2.

Rokach (2001) studied a Canadian sample for antecedents of loneliness and she presents a clustered model that includes three factors, relational deficits, traumatic events, and characterological and developmental variables. The factor of relational deficits encompasses social issues and includes perception of not belonging. Traumatic events encompasses changes in mobility, moving, loss, death, or crisis that changes one's world or makes one keenly aware of personal limitations. Characterological and developmental variables include childhood issues, self-perception, illnesses, and social skills deficits (Rokach, 2001). Contrary to psychodynamic loneliness theories, Rokach (2001) reports that only 5.5% of antecedents related back to childhood and developmental deficits.

Letvak (1997) reported a qualitative study of the experience of living alone in a rural community for older women. This study was performed in the Southern Adirondacks of New York where Letvak interviewed 8 women, aged 68-86, to the point of redundancy. She was able to identify two themes from the interviews that were described as Connectedness and Need for Control (Letvak, 1997). Connectedness was described as having three subcategories associated with it; connection to non-kin, connection to God, and connection through personal visits. Need for Control related to the personal boundaries felt by these women, who wanted to maintain a

balance between connectedness and privacy. They viewed independent living as being in control and it was very important to them.

McInnis (2001) explored loneliness in the older adult in a qualitative research study of 20 Canadians, aged 71 through 85 years. All were community dwelling, 16 were widowed, 1 was never married, 1 was presently married, and 2 were divorced or separated. Sixteen of the participants lived alone, one with a spouse, and three lived with other older adults. They had all been retired from 12 to 26 years. From these interviews, McInnis was able to identify 5 major themes from the interview data;

1. Loneliness occurred when the older adult experienced the perceived absence or the fracture of important relationships, as a result of either death or separation.
2. Loneliness occurred in the older adult as a response to the pain, darkness, and desolation accompanying the perceived ending of a relationship with their loved ones, and their resistance to the invitation of openness to the community in which they live.
3. Loneliness is avoided or dealt with by using ways of coping which may or may not be helpful.
4. Loneliness is a state of anxiety, fear, and sadness influenced by the actual or fear of dependency, and the decreased level of functioning.
5. Loneliness is a state of silent suffering in which the person is reluctant or unable to verbalize his or her loneliness (McGinnis & White, 2001).

Two additional studies contributed to the qualitative review. Wylie, Copeman and Kirk (1999) taped interviews of thirteen older women about social factors and food choices. They were able to show that older women have inadequate intake of fluid, fruit and vegetables, and non-starch polysaccharides. Seven subjects did identify loneliness as a social factor that influenced both their food choices and desire to prepare meals. One mixed methods approach by

Barg and colleagues (2006) revealed that older adults view loneliness as a prodrome to depression, although they may sometimes view it as a normal expectation of aging or as being self-imposed.

Qualitative research has shown some consistency in themes related to loneliness. The first two themes identified by McGinnis (2001) are consistent with the relational and traumatic event factors identified by Rokach (2001). McGinnis (2001) and Letvak (1997) also had similar results. Letvak's research revealed the themes of connectedness which relates to the theme identified by McGinnis of fractured relationships producing pain and feelings of anxiety. Letvak also identified a theme of needing control which corresponds to the fear of dependence and silent suffering that McGinnis identified.

The qualitative data identified by Barg (2006), Copeman and Kirk (1999), and McGinnis (2001) is supportive of the psychological, social, and physical findings reported in the quantitative studies. McGinnis extracted a theme that loneliness was a state of anxiety, fear or sadness that is very similar to the psychological symptoms described by Berg (1981). Wylie and colleagues' (1999) nutritional findings are supportive of the findings by Walker and Beauchene (1991). Barg and colleagues (2006) revealed that older adults view loneliness as a prodrome to depression which is similar to findings of Cacioppo (2006) that loneliness is a predictor to depression.

Summary of Literature Findings

This preceding review examines two theoretical underpinnings of loneliness followed by a review of quantitative and qualitative studies that have evaluated the problem of loneliness using older adult samples. There are gaps in both the theoretical and empirical literature when seeking health-related or nursing theories relating to loneliness. The two major loneliness

theories that are reviewed in this chapter, psychodynamic and cognitive, are psychological theories of loneliness. While the cognitive theory could serve as some rationale for this research, additional theories are needed portraying the relationship of loneliness to health.

The empirical literature review demonstrates that loneliness is a significant problem for older adults and that there are mixed conclusions regarding the relationship of age and gender to loneliness. Studies have shown that advancing age may correlate with loneliness but for the old-old group, age may not be a factor relating to loneliness (Holmen et al., 1992). Multiple studies reported that the prevalence is higher in older women but it has also been reported that women may over report and men may underreport loneliness because of the stigma attached to it (Borys & Perlman, 1985).

Physical, psychological and social problems have been related to loneliness. Multiple physical health measures including poor perceived health, chronic illness, functional impairment, physical symptoms, malnutrition and cardiovascular problems have been correlated with loneliness. Psychological stress, anxiety, and depression have also been related to loneliness in quantitative research studies. Social factors related to loneliness have included marital status, low education, poverty, and living alone.

Loneliness is associated with negative health behaviors and negative health outcomes. Lonely individuals have been reported to be more likely to have high body mass index, smoke, use alcohol, visit healthcare providers more often and have early admission to long-term care. Additionally, lonely individuals have been reported as having higher incidences of hypertension, heart disease, stroke, and sleeplessness.

Qualitative research has proven to be descriptive of loneliness and has been supportive of findings from quantitative research. From five qualitative studies it is clear that multiple factors

contribute to loneliness including relationship problems, need for belonging, traumatic life events, developmental factors, and need for control. These studies also reinforced that loneliness impacts the health of the older adult by negatively impacting their choice to cook and prepare meals as well as food choices. The qualitative review also demonstrated that older adults view loneliness as a prodrome to depression.

This review identifies that there are gaps in the literature when seeking to understand the health-related risks for loneliness as well as the differences in outcomes for those who experience loneliness, particularly older adults in the United States. Studies completed in the United States have used samples that are specific to single states or have largely taken place in the Northeast, West or Midwest and are therefore not generalizable to U.S. older adults. The geographic location of each study is presented in Appendix A, Table 1. This study addressed this gap in the literature and enhances the body of knowledge related to loneliness.

CHAPTER 3: METHODOLOGY

Research Design

This study uses a longitudinal research design that includes descriptive and analytic components. The intent of this study was to test two models, one representing risks of loneliness and the other representing postulated outcomes associated with loneliness using a sample of those over age 50 and living in the United States. The analyses included univariate and bivariate procedures, logistic regression analysis to examine the data for predictors, and finally ANOVAs, comparative means testing and analysis of covariance tests to evaluate the outcome differences between those who are chronically lonely, briefly lonely, or never lonely.

Data Source: Health and Retirement Study

The HRS is a biennial longitudinal survey that began in 1992. The survey focuses on the physical, mental, social, and financial characteristics of the aged in the United States. It is a random, national sample of over 26,000 adults age 50 and over. The HRS effort is supported by the National Institute on Aging (NIA U01AG009740) and is administered through the University of Michigan Institute for Social Research. The RAND dataset, version G was used for this study. This file was made available on the HRS website, <http://hrsonline.isr.umich.edu/index.html> (National Institute on Aging, 2006), in May 2007. This dataset includes HRS data from all collection times since 1992. Data used for this analysis was from Wave 6 (2002) and Wave 7 (2004).

Sampling Design of the Health and Retirement Study

The sampling objective of the HRS is to collect data on adults aged 50 and over who are community dwelling and living in the contiguous United States. The sample for the HRS is a merged sample of respondents who participated in the Asset and Health Dynamics among the

Oldest Old (AHEAD) study and those who have been enrolled directly in the HRS. The samples were merged by the use of a single interview in 1998. The HRS sample includes spousal and household observations with the criterion that an eligible household must have at least one person who is age-eligible living in the home. According to the HRS website, the original sample for the 1992 collection of HRS data included 12654 respondents from 7704 households. The AHEAD sample includes 8222 respondents from 6046 households (<http://hrsonline.isr.umich.edu>).

Cohort samples have been added to the HRS since initial data collection. In 1998, two cohorts were added to reflect the War Babies (WB) and the Children of the Depression Age (CODA). In 2004, a new cohort was added to reflect the Early Baby Boomers (EBB). These respondents were randomly selected from Medicare enrollment files. As of the 2004 data collection, a total of seven waves have been collected in the HRS including six AHEAD waves, four CODA and WB waves, and one EBB wave (<http://hrsonline.isr.umich.edu>).

Mode of HRS Data Collection

The HRS design does follow several rules for collecting data and following respondents. Participants are initially enrolled through personal face to face interview and then followed through telephone interview. All persons who were initially enrolled are followed unless they insist that they be removed or have died and an exit interview has been obtained. Both old and new spouses and partners who have been reported by respondents are sought for interview. Spouses of an eligible respondent may enter at any age. For those respondents who are deceased, proxies are sought for exit interviews. Post-exit interviews are sought prior to estate settlement if the exit interviews are deemed incomplete. Though the initial enrollment in the HRS requires

that the respondent be community-dwelling, respondents who enter long-term care after enrolling continue to be followed after relocating (<http://hrsonline.isr.umich.edu>).

Access to HRS Data Files

The dataset used for this research was derived from the public data access files prepared by Rand Corporation. This file is available through the HRS website. In order to obtain the data, users must register through the HRS website, <http://hrsonline.isr.umich.edu/index.html> (National Institute on Aging, 2006), and agree to the following conditions on use:

1. Make no attempts to identify study participants.
2. Not transfer HRS Public Release data to any third party other than staff or students for whom you are directly responsible.
3. Not allow others to use your username and password to access this site.
4. Certify the destruction of any downloaded Public Release data file as well as any data files derived from the downloaded file when requested to do so by the Health and Retirement Study.
5. Include the following citation in any research reports, papers, or publications based on Public Release data:

In text:

"The HRS (Health and Retirement Study) is sponsored by the National Institute of Aging (grant number NIA U01AG009740) and is conducted by the University of Michigan."

In references:

"Health and Retirement Study, ([insert Product Name]) public use dataset. Produced and distributed by the University of Michigan with funding from the National Institute on Aging (grant number NIA U01AG009740). Ann Arbor, MI, (year)."

6. To include the following citation in any research reports, papers, or publications based on any Public Release data file tagged as "Early" or "Preliminary":

"This analysis uses Early Release data from the Health and Retirement Study, ([insert Product Name]), sponsored by the National Institute of Aging (grant number NIA U01AG009740) and conducted by the University of Michigan. These data have not been

cleaned and may contain errors that will be corrected in the Final Public Release version of the dataset."

7. Provide information regarding publications based on data obtained from the Health and Retirement Study by sending a copy of any papers or publications using HRS public files or datasets to:

Health and Retirement Study
Room 3050 ISR
P.O. Box 1248
Ann Arbor, MI 48106-1248.

8. Report immediately to the Health and Retirement Study at hrsquest@isr.umich.edu any disclosure of study participant identity as well as any discovery of flaws or errors in the data or documentation files.

9. Notify the Health and Retirement Study through use of the update function provided at this site or by electronic mail directed to hrsquest@isr.umich.edu of changes in your electronic mail address, postal address, telephone number, organizational affiliation or organizational status.

The RAND HRS data file version G was used for this analysis. This file is produced by RAND Corporation and was made available through the HRS website in May of 2007. No "Early" or "Preliminary" data was used for this proposed research. The Version G RAND dataset includes data from 1992 through 2004.

Human Subjects

This study is a secondary data analysis and did not meet the criteria for "human subjects" research. The RAND HRS data files have no identifiable information and the data file was not obtained through intervention or interaction with a respondent to the HRS. West Virginia University, Office for Protection of Research Subjects does not require an IRB application or IRB registration for research using de-identified data (http://www.wvu.edu/~rc/irb/irb_guid/).

Proposed HRS Sample for this Research

From the RAND data file, respondents who are aged fifty years and over and who participated in both waves 6 (2002) and 7 (2004) were selected to meet the following inclusion criteria; no proxy use, non-nursing home living at wave 6 (2002), and valid information on selected variables. Due to the subjective nature of the variables being used, it was deemed necessary to exclude those who used proxies.

Research Questions

This study had nine primary research questions:

Question 1: Are there differences in sociodemographic and health-related factors between people who are lonely and those who are not lonely?

Question 2: What sociodemographic and health related factors are predictive of loneliness in adults aged 50 and older living in the U.S (Time 1)?

Question 3: Is there a difference between those who are never lonely, briefly lonely or chronically lonely in moderate activity level (Time 2),

Question 4: Is there a difference between those who are never lonely, briefly lonely, or chronically lonely in tobacco use (Time 2),

Question 5: Is there a difference between those who are never lonely, briefly lonely, or chronically lonely in alcohol use (Time 2).

Question 6: Is there a difference between those who are never lonely, briefly lonely, or chronically lonely in depression scores (Time 2).

Question 7: Is there a difference between those who are never lonely, briefly lonely, or chronically lonely in increase in number of chronic illnesses (Time 1 to Time 2)?

Question 8: Is there a difference between those who are never lonely, briefly lonely, or chronically lonely in number of outpatient clinic visits (Time 1 to Time 2).

Question 9: Is there a difference between those who are never lonely, briefly lonely, or chronically lonely in number of nursing home stays (Time 1 to Time 2)?

Hypotheses for Research Questions One and Two

Hypothesis 1: Older persons will be more likely to report loneliness.

Hypothesis 2: Females will be more likely than males to report loneliness.

Hypothesis 3: Respondents who are non-married will be more likely than those who are married to report loneliness.

Hypothesis 4: Respondents who live alone will be more likely to report loneliness.

Hypothesis 5: Respondents with less than high school education will have a greater likelihood of reporting loneliness.

Hypothesis 6: Lower household income will increase likelihood of reporting loneliness.

Hypothesis 7: Higher numbers of chronic illnesses will increase likelihood of reporting loneliness

Hypothesis 8: Higher levels of functional impairment will increase likelihood of reporting loneliness.

Hypothesis 9: Respondents with poorer self-report of health will be more likely to report loneliness than those who report their health as better than poor.

Hypothesis 10: Use of home care will decrease likelihood of reporting loneliness.

Hypotheses for Research Questions Three through Nine

Hypothesis 1: Those who are chronically lonely will have less moderate activity than those who are briefly lonely or never lonely.

Hypothesis 2: Those who are chronically lonely will have more tobacco use than those who are briefly lonely or never lonely.

Hypothesis 3: Those who are chronically lonely will have more alcohol use than those who are briefly lonely or never lonely.

Hypothesis 4: Those who are chronically lonely will have a greater increase in number of chronic illnesses than those who are briefly lonely or never lonely.

Hypothesis 5: Respondents who are chronically lonely will have higher depression scores on the modified CESD 7-item scale than those who are briefly lonely or never lonely.

Hypothesis 6: Respondents who are chronically lonely will have outpatient doctor contacts than those who are briefly lonely or never lonely.

Hypothesis 7: Respondents who are chronically lonely will have more nursing home nights than those who are briefly lonely or never lonely.

Selected Variables

Variables were included in the models to be tested based on results from reviewed studies of loneliness. Operationalized definitions of the variables selected for the models are listed below. The specific questions from the HRS that were used to obtain the data for the variables are presented in Appendix A, Table 3.

Sociodemographic Risk Variables

1. Age (R6AGEY_E). Age is calculated by using the birth date and reported as the chronological age in years as of the ending interview date for Wave 6 (2002).
2. Gender (RAGENDER): Gender is self-reported and expressed as a categorical variable of male (1) or female (2). Gender was recoded to male = 0 and female = 1.

3. Marital Status (R6MSTAT). Marital status is a categorical variable that was collected at time one, year 2002. The options for answering are:

1. Married.
2. Married with spouse absent.
3. Partnered
4. Separated.
5. Divorced.
6. Separated/divorced.
7. Widowed.
8. Never married.

This variable was recoded to a maximum of 6 categories as follows:

1. Married.
2. Married with spouse absent.
3. Partnered.
4. Separated/divorced.
5. Widowed.
6. Never married.

Health-Related Risk Variables

1. Living Alone (H6HHRES). This numerical variable measures the number of persons living in the household including the respondent. If the response is 1 then the respondent lives alone.
2. Education (RAEDUC). This is a categorical variable with five possible responses. The categories are scored as listed; less than high school (1), GED (2), High School Diploma (3), some college (4), and college and up (5).

3. Income (H6ITOT). This is a continuous variable that is a numerical representation of the total household income per year. This variable was recoded into quartiles for the logistic regression analysis. The variable was centered on the median income due to a positive skew for income.

Values were assigned as 0 = \$62,884 and up/year, 1 = \$34058-\$62884/year, 2 = \$18001-\$34057/yr, and 3 = less than \$18000/yr.

4. Number of Chronic Diseases (R6CONDE). This numerical variable is a sum calculation of chronic diseases that ranges from 0 to 8. The respondents were asked if they have had eight different chronic diseases: arthritis, heart disease, hypertension, stroke, lung disease, diabetes, cancer, or psychiatric problems. Each "yes" answer is scored as 1 and each "no" answer is scored as 0.

5. ADL Impairment (R6ADLA). This numerical variable is computed as a sum of five different ADL variables. Respondents were asked if they have had any difficulty with bathing, dressing, eating, getting out of bed, or walking. These five variables are scored as yes (1) and no (0). The R6ADLA computed variable is a sum of these five scores and ranges from 0 to 5.

6. Self-Report of Health (R6SHLT). This categorical variable was measured at time one, year 2002. Respondents are asked to rate their health in one of five categories. The categories are scored as excellent (1), very good (2), good (3), fair (4), poor (5).

7. Use of Home Care (R6HOMCAR). Respondents were asked if a professionally trained person has come to their home in the past two years to help with their care. This dichotomous variable is scored as yes (1) or no (0).

Time One Loneliness Variable for Risk Analysis

Loneliness (R6FLONE). This variable was collected in the year 2002. Respondents were asked if they have been "feeling lonely" for most of the past week. The variable is coded as a dichotomous measure of loneliness, self-reported as yes (1) or no (0).

Loneliness Categorical Variable for Outcome Analysis

The categorical loneliness variable was named "lonely3cats" and was created through recoding the time one and time two loneliness variables as follows:

Never lonely (not lonely at time one or time two): Scores of 0 = 0.

Briefly lonely (lonely at time one or time two): Scores of 1 or 2 = 1

Chronically lonely (lonely at both times one and time two): Scores of 3 = 2.

Health Outcome Variables

Health Behavior Variables

1. Moderate Activity Level (R7MDACTX). Respondents are asked how often do you take part in sports or activities that are moderately energetic such as, gardening, cleaning the car, walking at a moderate pace, dancing, floor or stretching exercises? The possible responses are scored as:

1. Every day.
2. Greater than one time per week.
3. One time per week.
4. One to three times per month.
5. Never.

2. Tobacco Use (R7SMOKEN). This is measured as a dichotomous variable based on whether the respondent smokes at the time of the survey. It is coded as yes (1) and no (0).

3. Alcohol Use (R7DRINKD). This is a numerical variable reporting the number of days per week that the respondent drinks. Reported answers range from 0 to 7 days.

Illness Outcome Variables

1. Increase in Chronic Disease (R7CONDS). This numerical variable ranges from 0 to 8 and reflects the number of new chronic illnesses that the respondent has reported since time one data collection.

2. Depression (R7CESD). The initial CES-D used by the HRS survey is the 8-item CES-D (Turvey, Wallace, & Herzog, 1999) which is a shorter version of the original CES-D which was designed for survey data. . There are six negative indicators and two positive indicators. The "positive" indicators are reverse scored so that a higher sum equates to more depression. The negative indicators measure whether the respondent experienced the following sentiments all or most of the time: depression, everything is an effort, sleep is restless, felt lonely, felt sad, and could not get going. These indicators are scored as 1 if the respondent answers "yes" and scored as 0 if the respondent answers "no". The positive indicators measure whether the respondent felt happy and enjoyed life, all or most of the time. These positive items are scored as 0 if the respondent answers "yes" and scored as "1" if the respondent answers "no". For this analysis, the CES-D score was recomputed to exclude the lonely item, giving it a total score that ranges from 0 to 7. This is consistent with what has been done in other studies to avoid item-overlap in the analysis (Cacioppo et al., 2006).

Health Care Utilization Variables

1. Number of physician contacts (R7DOCTIM). This numerical variable is measured as the number of physician contacts in the 2 year period between 2002 and 2004.

2. Nursing home stays (R7NRSNIT). Respondents were asked how many nursing home nights they have had in the 2 years prior to the interview. The answers were reported as a numerical variable of number of nights between 2002 and 2004.

Data Analysis Process

Sample Selection

Cases were selected from the RAND data file to meet the following inclusion criteria:

1. Age 50 and over.
2. Participated in Wave 6 (2002) and Wave 7 (2004).
3. No proxy use.
4. Answered loneliness item at Wave 6 (2002) and Wave 7(2004).
5. Non-nursing home living at Wave 6 (2002).
6. Complete data on the independent variables for the risk analysis.

Data Analysis Process Description

Data analysis began with analysis for descriptive and frequency information. Descriptive assessment of the data included viewing minimums, maximums, means, modes and medians, as well as ranges and assessment for skewness and kurtosis. Checks for normality were completed, including the viewing of histograms, boxplots, Normal Q-Q Plots, and also Detrended Normal Q-Q Plots.

A multistep process was undertaken to answer research questions one and two. Univariate, bivariate and correlational analyses were completed. Independent samples t-tests were used to assess the difference between the lonely and the non-lonely for continuous and discrete variables at time one (2002). Chi-square testing was completed for each categorical risk variable to test for independence of the loneliness variable. Correlations were run between the independent variables to check for multicollinearity. Logistic regression was then used to assess the independent variables as risks for loneliness. The loneliness variable was regressed on the

significant independent variables through the use of the binary logistic regression procedure in SPSS using the forward conditional selection procedure.

Part two of the data analysis sought to answer research questions 2, 3, and 4. Initially, correlations were run between the loneliness categorical variable and all of the dependent outcome variables. One-way ANOVAs were then used to assess the difference between the loneliness groups for each dependent variable. Tukey's Honestly Significant Difference Tests were completed to obtain a more detailed picture of where the groups differed. Finally, independent analyses of covariance tests were run to see if the group differences persisted while controlling for the predictors from part one of the analyses.

Figure 4. Operationalized model of hypothetical risks of loneliness.

Figure 5. Operationalized model of hypothetical outcomes associated with loneliness.

CHAPTER 4: RESULTS

This study examined sociodemographic and health-related risks for loneliness and outcome differences by loneliness status as reported by community dwelling older adults in the United States. This research was completed through the testing of two models delineating these risks and outcomes. This chapter gives a description of the dataset and sample and then presents the data in two parts. Part one presents the data analysis that was undertaken to evaluate risks for loneliness. Part two presents the findings from the analyses examining the differences in health outcomes for those who are chronically lonely, briefly lonely, or never lonely.

Obtaining the Study Sample

The sample for this secondary data analysis was obtained from the RAND corporation Health and Retirement Study data file, version G. The sample included 13,812 respondents who were chosen based on the following criteria: responded to Wave 6, 2002 (time 1) and to Wave 7, 2004 (time 2) (n=16,204), did not use proxies in either wave (n=14,298), were non-nursing home living at time one (n=14,240), answered the loneliness questions at both waves (n=14,195), and had complete data for all independent variables in part one of the analysis (n=13,812).

Sample Description

Sociodemographic descriptors of the sample from time one (2002) are presented in Table 4. Of the 13,812 respondents, 61.3% were female and 38.7% were male. Respondents ranged in age from 50 to 100 years with a mean age of 67.7 years (SD=9.164) indicating a mild positive skew for age. Just over 41% ranged in age from 50 to 64 years, fifty-four percent were between the ages of 65 and 84 years of age with only 4.6% being 85 years and older. The sample had a fairly normal age distribution with the exception of those aged 50 to 55 years. There were fewer respondents in this age range perhaps because the Early Baby Boomer cohort was excluded as

they were added to the HRS in 2004 and therefore did not participate in Wave 6 (2002). The majority of the sample was married (63.3%). Just over twenty percent were widowed and 10.6% were separated or divorced. Only 2.7% were never married, 2.5% were partnered and less than 1% was married with a spouse absent. The majority of the sample had a GED, high school diploma, or above (77.6%). Only 22.4% reported an educational level less than high school.

The income variable had a very positive skew. The initial income variable had a tremendous range from zero to over seven million dollars per year. For this reason, it was divided into quartiles and centered on the median income level, which was \$34,057.00. The measures of central tendency for the income variable are provided in Table 7. For the upcoming logistic regression analyses, the quartile income variable was used.

Table 4.

Sociodemographic Characteristics of the Sample at Time One (2002)

Variable	Category	n (%)
Gender		
	Female	8463 (61.3)
	Male	5,349 (38.7)
Age		
Mean age 67.7 years	50-64	5,728 (41.5)
(SD = 9.16)	65-84	7,451 (53.9)
	85 and over	633(4.6)
Marital Status		
	Married	8,738 (63.3)
	Married, spouse absent	82 (0.6)
	Partnered	340 (2.5)
	Separated/ Divorced	1,465 (10.6)
	Widowed	2,816 (20.4)
	Never Married	371 (2.7)
Education		
	Less than High School	3,092 (22.4)
	High School Equivalency Test	637 (4.6)
	High School Diploma	4,534 (32.8)
	Some college	2,856 (20.7)
	College and higher	2,693 (19.5)
Household Income (\$/year)		
	1st quartile (\$0-\$18,000)	3,472 (25.1)
	2nd quartile (\$18001-\$34,057)	3,434 (24.9)
	3rd quartile (\$34,058-\$62,884)	3,454 (25.0)
	4th quartile (\$62,885 and up)	3,452 (25.0)

Note. N = 13,812

Loneliness was a problem for a small proportion of the respondents in this sample. The overall prevalence of loneliness was 16.9 % at time one (2002). Health-related descriptors of the sample, at time one, are presented in Table 5. The majority (77%) of the sample lived with others. Only 23.3% reported living alone. Excellent health was reported by 12.3% of respondents. Over 30% reported their health as "very good" and 32.6% reported their health as "good". Only 6.2% reported "poor" health. Incidence of chronic illness was prevalent with only 15.2% reporting no chronic illness. The remaining nearly 85% reported at least one chronic illness and 30.7% reported three or more chronic illnesses. In spite of the prevalence of chronic illness, the majority (86.7%) of the sample reported no functional impairment. Only 5.4% reported using professional home care since the 2000 data collection date.

Table 5.

Health-Related Characteristics of the Sample at Time One (2002)

Variable	Category	2002 n (%)
Loneliness		
	Yes	2,332 (16.9)
	No	11,480 (83.1)
Living Arrangements		
	Lives Alone	3,220 (23.3)
	Lives with others	10,592 (76.7)
Self-report of Health		
	Excellent	1,702 (12.3)
	Very Good	4,191 (30.3)
	Good	4,501 (32.6)
	Fair	2,555 (18.5)
	Poor	863 (6.2)
Number of Chronic Illnesses		
	None	2,095 (15.2)
	1 Chronic Illness	3,723 (27.0)
	2 Chronic Illnesses	3,762 (27.0)
	3 Chronic Illnesses	2,505 (18.0)
	4 Chronic Illnesses	1,155 (8.4)
	5 Chronic Illnesses	423 (3.1)
	6 Chronic Illnesses	121 (0.9)
	> 6 Chronic Illnesses	28 (0.002)
Functional Impairment		
	No Problem	11,978 (86.7)
	1 Problem Area	1,052 (7.6)
	2 Problem Areas	423(3.1)
	3 Problem Areas	209 (1.5)
	4 Problem Areas	104 (0.8)
	5 Problem Areas	46 (0.3)
Use of Home Care		
	Yes	743 (5.4)
	No	13,069 (94.6)

Note. Percentages may not add up to 100% due to rounding.

Table 6 provides a description of the categorical loneliness variable and the health outcome variables for the sample at time 2 (2004). The majority of respondents (74.7%) were not lonely at time one or time two. There were 1,215 (8.8%) respondents who were categorized as chronically lonely since they reported feeling lonely at both time periods. Only 5.8% of the sample reported exercising every day. However, 46.4% exercised more than once per week. Only 22% of respondents never exercised. Over sixty-eight percent of the sample reported never drinking alcohol. Only 7.5% reported daily alcohol use. Although the respondents reported a high incidence of chronic illness, the majority (76.9%) did not develop a new chronic illness from time one (2002) to time two (2004). Less than one in five respondents (19.5%) reported one new chronic illness and only 3.2% reported 2 new chronic illnesses.

Table 6.

Description of Categorical Variables at Time Two (2004).

Variable	Category	n (%)
Loneliness Categories	Never Lonely	10,313 (74.7)
	Briefly Lonely	2,284 (16.5)
	Chronically Lonely	1,215 (8.8)
Moderate Activity Level	Every day	799 (5.8)
	More than once per week	6,411 (46.4)
	Once per week	2,192 (15.9)
	One to three times per month	1,336 (9.7)
	Never	3,066 (22.2)
Currently Smoking	No	6,214 (45.0)
	Yes	1,751 (12.7)
	No answer	5,847 (42.3)
Alcohol Use in Days/Week		
	Never Drinks	9,485 (68.7)
	Drinks One day per week	1,311 (9.5)
	Drinks two days per week	696 (5.0)
	Drinks three days per week	577 (4.2)
	Drinks four days per week	277 (2.0)
	Drinks five days per week	275 (2.0)
	Drinks six days per week	128 (0.9)
	Drinks every day	1,041 (7.5)
	No answer	22 (0.2)
Number of New Conditions since 2002		
	None	10,626 (76.9)
	One	2,694 (19.5)
	Two	437 (3.2)
	Three	53 (0.4)
	Four	2 (0.0)

Table 7 gives the results for the measures of central tendency for the numeric outcome variables of nursing home nights and doctor visits. Both numeric variables were positively skewed. There were 13,472 (97.5%) respondents who did not have any nursing home nights. Only 2.5% of respondents reported nursing home stays. Of those who did report nursing home stays, 234 (1.69%) reported 90 days or less in the nursing home. Due to the positive skew in the nursing home nights, the mean for nursing home stays was still 2.86 nights (SD 35.53). From the 13,382 respondents who reported physician contacts, the average contact was over 10 since the Wave 6 (2002) interview. Again, this variable had a very large range from zero to 836 physician contacts. The median number of contacts was 6, with a mean of 4 contacts.

Table 7.

Description of Continuous Outcome Variables for Time Two (2004)

Variable	n	Min	Max	Mean	SD	Median	Mode
Number of nights in a nursing home	13,793	0	914	2.86	35.53	0	0
Number of outpatient doctor contacts	13,382	0	836	10.29	19.01	6	4

Results for Risks of Loneliness

Part one of the analysis addressed the following research questions:

Are there differences in sociodemographic and health-related factors between people who are lonely and those who are not?

Which sociodemographic and health related factors increase the likelihood of self-report of loneliness in adults aged 50 and older living in the U.S (Time 1)?

There were 10 hypotheses relating to the above two research questions. They were as follows:

Hypothesis 1: Older persons will be more likely to report loneliness.

Hypothesis 2: Females will be more likely than males to report loneliness.

Hypothesis 3: Respondents who are non-married will be more likely than those who are married to report loneliness.

Hypothesis 4: Respondents who live alone will be more likely to report loneliness.

Hypothesis 5: Respondents with less than high school education will have a greater likelihood of reporting loneliness.

Hypothesis 6: Lower household income will increase likelihood of reporting loneliness.

Hypothesis 7: Higher numbers of chronic illness will increase likelihood of reporting loneliness

Hypothesis 8: Higher levels of functional impairment will increase likelihood of reporting loneliness.

Hypothesis 9: Respondents with poorer self-report of health will be more likely to report loneliness than those who report their health as other than poor.

Hypothesis 10: Use of home care will decrease likelihood of reporting loneliness.

A series of independent samples t-tests were run for the continuous and discrete variables; age, number in household, income, number of chronic illnesses, and functional

impairment, to determine if there was a difference between the lonely and non-lonely groups for each variable at time one (see Table 8). The lonely were significantly different from the non-lonely on each discrete variable. The lonely group had a higher mean age, 69.42 years versus 67.39 years ($t=9.783$, $p<0.005$), less average number of people living in the home, 1.89 versus 2.15 ($t=11.284$, $p<0.005$) lower mean annual household income, \$32,918 versus \$58,236 ($t=11.446$, $p<0.005$), higher average number of chronic illnesses, 2.39 versus 1.81 ($t=18.811$, $p<0.005$), and more functional impairment, 0.51 versus 0.17 ($t=21.45$, $p<0.005$).

Table 8.

Mean Score Comparisons Lonely/Not Lonely Groups at Time One (2002)

Variable	Lonely		Non-Lonely		Significance	
	Mean	SD	Mean	SD	t	p
Age	69.42	9.94	67.39	8.95	9.783	<0.005
Number in Household	1.89	1.17	2.15	0.99	11.284	<0.005
Annual Household Income	32,918	48,465	58,237	104,557	18.087	<0.005
Number of chronic Illnesses	2.39	1.49	1.81	1.31	18.811	<0.005
Functional Impairment	0.51	1.03	0.17	0.59	21.450	<0.005

Note. Equal variances assumed except for annual household income.

Cross-tabulations of the time one (2002) lonely variable with the categorical variables of gender, marital status, education, self-report of health, and use of home care are reported in Table 9. When the lonely group was compared to the non-lonely group at time one, the lonely group had a higher percentage of women reporting loneliness (chi-square 75.315, $p < 0.005$). The non-lonely group had nearly twice the percentage of married respondents when compared to the lonely group. The lonely group reported less education, poorer self-report of health, and a higher percentage of respondents who used home care.

Table 9.

Chi-Square Results for Sociodemographic and Health-Related Risks for Loneliness

Variable	Category	Lonely	Not Lonely	Chi-square, p value
Gender	Male	717 (30.7)	4,632 (40.3)	73.315,p<0.005
	Female	1,615 (69.3)	6,848 (59.7)	
Marital Status	Married	744 (31.9)	7,994 (69.6)	1,339.79,p<0.005
	Married, spouse absent	42(1.8)	40 (0.3)	
	Partnered	50 (2.1)	290 (2.5)	
	Separated/Divorced	407 (17.5)	1,058 (9.2)	
	Widowed	1,000 (42.9)	1,816 (15.8)	
	Never married	89 (3.8)	282 (2.5)	
	Education	< High School	852 (36.5)	
GED	119 (5.1)	518 (4.5)		
High School	719 (30.8)	3,815 (33.2)		
Some College	405 (17.4)	2451(21.4)		
College +	237 (10.2)	2,456 (21.4)		
Self-report of Health	Excellent	137 (5.9)	1,565 (13.6)	721.044,p<0.005
	Very good	474 (20.3)	3,717 (32.4)	
	Good	707 (30.3)	3,794 (33.0)	
	Fair	649 (27.8)	1,906 (16.6)	
	Poor	365 (15.7)	498 (4.3)	
	Use of Home	Yes	198 (8.5)	
No	2,134 (91.5)	10,935(95.3)		

Correlations were run between all time one risk variables and the time one loneliness variable. There were no correlations over 0.50 indicating that multicollinearity is not a problem with these variables. All variables had significant independent correlation to the loneliness variable indicating some relationship to the loneliness variable. This is not surprising given the large sample size. The highest correlation was between self-report of health ($r = 0.48$), followed by the correlations between marital status and income ($r = 0.46$) and education and income ($r = 0.44$). The correlations are displayed in Table 10.

Table 10.

Correlation Coefficients of Risk Variables and Time One (2002) Lonely Variable

Variable	1	2	3	4	5	6	7	8	9	10
1. Age	-	-								
2. Gender	-.32**	-								
3. Marital Status	.26**	.22**	-							
4. Number in Household	-.25**	-.07**	-.37**	-						
5. Education	-.12**	-.08**	-.13**	-.06**	-					
6. Income	.30**	.16**	.46**	-.13**	-.44**	-				
7. Number of Chronic Illnesses	.19**	.03**	.11**	-.02*	-.18**	.23**	-			
8. Functional Impairment	.07**	.05**	.10**	.01	-.14**	.19**	.28**	-		
9. Self-Report of Health	.11**	.03**	.13**	.02**	-.30**	.32**	.48**	.36**	-	
10. Use of Home Care	.11**	.04**	.06**	-.03**	-.03**	.09**	.17**	.21**	.17**	-
11. Loneliness	.08**	.07**	.29**	-.09**	-.17**	.23**	.16**	.18**	.21**	.06**

** Correlation is significant at the 0.01 level (2-tailed).

*Correlation is significant at the 0.05 level (2-tailed).

Note. N=13,812.

Results from the t-test and chi-square analyses indicated that all independent variables differed significantly between the two groups. Since the lonely differed from the non-lonely for all variables in the model, they were all entered into the logistic regression using the forward conditional selection procedure in SPSS. Entry and exit criterion for the analysis was set at 0.1, and the cut value was set at 0.17 to reflect the prevalence of loneliness in this large sample. The cut value was chosen to minimize Type I error (those cases that were actually observed lonely but predicted to be non-lonely).

After eight iterations, non-married status was the primary predictor of loneliness, followed, in order, by self-report of health, education, functional status, number of chronic illnesses, age, income, and number living in the household. Respondents who were not married were more likely to report loneliness. Those who were married with the spouse absent were over ten times more likely to report loneliness when compared to those who were married. Respondents with poor health were over three times more likely to report loneliness when compared to those with excellent health. Respondent with functional impairment and chronic illness were also more likely to report loneliness. Those with increasing income and education were less likely to report loneliness. Those with advancing age were slightly less likely to report loneliness. At this point, number in household was marginally significant ($p = 0.037$). Respondents who lived with others were only slightly less likely to report loneliness. After accounting for the effects of the other independent variables, gender and use of home care did not remain in the model as predictors of loneliness (See Table 11).

Table 11.

Logistic Regression for Explanatory Variables of Self-Reported Loneliness, Sample size = 13,812.

Variable	B	SE	OR	95% CI		p
				Lower	Upper	
Marital Status						
Married			(ref)1.00			
Married, Spouse Absent	2.355	0.238	10.535	6.611	16.788	<0.005
Partnered	0.476	0.164	1.609	1.166	2.220	0.004
Separated/Divorced	1.163	0.081	3.200	2.732	3.749	<0.005
Widowed	1.592	0.069	4.911	4.287	5.627	<0.005
Never Married	1.067	0.137	2.907	2.222	3.803	<0.005
Self-Report of Health						
Excellent			(ref)1.00			
Very good	0.220	0.106	1.246	1.012	1.534	0.038
Good	0.382	0.105	1.465	1.193	1.799	<0.005
Fair	0.730	0.112	2.076	1.666	2.586	<0.005
Poor	1.232	0.133	3.428	2.640	4.451	<0.005
Education						
<High School			(ref)1.00			
GED	-0.232	0.119	0.793	0.628	1.001	0.051
High School Diploma	-0.359	0.065	0.699	0.615	0.793	<0.005
Some College	-0.385	0.076	0.680	0.586	0.790	<0.005
College +	-0.681	0.093	0.506	0.422	0.608	<0.005
Functional Impairment	0.205	0.031	1.228	1.154	1.306	<0.005
Number of Chronic Illnesses	0.090	0.020	1.094	1.053	1.138	<0.005
Age	-0.013	0.003	0.988	0.982	0.993	<0.005
Income						
>\$62,885.00/yr			(ref)1.00			
\$34,058-62,884/yr	-0.021	0.089	0.979	0.822	1.166	0.812
\$18,001-\$34,057/yr	0.142	0.089	1.152	0.968	1.371	0.110
<\$18,000/yr	0.222	0.095	1.248	1.037	1.502	0.019
Number in Household	-0.052	0.025	0.950	0.905	0.997	0.037

Note. Initial -2 Log Likelihood of 12,542.402, Final -2 Log Likelihood of 10,617.329.

Note. Gender and use of home care did not remain in the model as significant predictors of loneliness after the effects of the other risk variables.

Multiple statistical techniques were used to evaluate the fit of the model. The Omnibus Tests of Model Coefficients indicated that eight of the ten variables are significant predictors of loneliness. The model summary revealed a Cox & Snell R Square of 0.13 and a Nagelkerke R square of 0.218 indicating that the variables that remained in the model explained 13% to 21.8% of the variation in the loneliness variable. The Hosmer and Lemeshow goodness of fit test statistic differed from the Omnibus test and remained significant at only 3 iterations with a chi-square of 15.493, d.f 8, $p = .05$, but at eight iterations the Hosmer and Lemeshow revealed a chi-square of 31.972, d.f. = 8, $p < 0.005$. The classification table reported that the model classed 71.5% of "no" responses correctly and 71.7% of "yes" responses correctly for an overall 71.5% correct classifications. These results indicate an improvement from block zero with 0 "yes" responses correct. However, the correct "no" responses dropped from 83.1% correct at block zero to 71.5% correct at step 8. Non-married status was the primary predictor with 66% of "yes" responses being classified correctly at step one in the analysis. The other seven predictors that remain in the model account for the remaining improvement in correct "yes" classifications. Mallow's Cp test criterion for inclusion was viewed and suggested that all eight predictors be included in the model.

The regression analysis was supportive of eight of the ten hypotheses relating to risks of loneliness. non-married status, lower education, lower income, higher numbers of chronic illnesses, more functional impairment, poorer self-report of health, and fewer people in the household were predictors of self-report of loneliness. Hypothesis ten was supported because it was hypothesized that those who use home care would not be likely to report loneliness. The first and second hypothesis were not supported since gender did not remain in the model as a predictor and those with advancing age were less likely to report loneliness.

Results for Outcomes Reported with Loneliness

The second part of the statistical analysis for this study seeks to answer research questions three through nine which were stated as follows:

Question 3: Is there a difference in moderate activity between those who are never lonely, briefly lonely or chronically lonely (Time 2)?

Question 4: Is there a difference in tobacco use between those who are never lonely, briefly lonely, or chronically lonely (Time 2)?

Question 5: Is there a difference in alcohol use between those who are never lonely, briefly lonely, or chronically lonely (Time 2)?

Question 6: Is there a difference in depression scores between those who are never lonely, briefly lonely, or chronically lonely (Time 2)?

Question 7: Is there a difference in increase in number of chronic illnesses (Time 1 to Time 2) between those who are never lonely, briefly lonely, or chronically lonely in increase in number of chronic illnesses?

Question 8: Is there a difference in number of physician contacts (Time 1 to Time 2) between those who are never lonely, briefly lonely, or chronically lonely?

Question 9: Is there a difference in number of nursing home nights (Time 1 to Time 2) between those who are never lonely, briefly lonely, or chronically lonely?

There were seven hypotheses related to these research questions that were postulated in chapter 3. They are as follows:

Hypothesis 1: Those who are chronically lonely will have less moderate activity than those who are briefly lonely or never lonely.

Hypothesis 2: Those who are chronically lonely will have more tobacco use than those who are briefly lonely or never lonely.

Hypothesis 3: Those who are chronically lonely will have more alcohol use than those who are briefly lonely or never lonely.

Hypothesis 4: Those who are chronically lonely will have a greater increase in number of chronic illnesses than those who are briefly lonely or never lonely.

Hypothesis 5: Respondents who are chronically lonely will have higher depression scores on the modified CES-D 7-item scale than those who are briefly lonely or never lonely.

Hypothesis 6: Respondents who are chronically lonely will have outpatient doctor contacts than those who are briefly lonely or never lonely.

Hypothesis 7: Respondents who are chronically lonely will have more nursing home nights than those who are briefly lonely or never lonely.

The loneliness categorical variable included 10,313 never lonely respondents (74.7%), 2,284 respondents who reported loneliness at time one or time two (16.5%), and 1,215 chronically lonely respondents (8.8%). Analysis of variance testing, comparing this loneliness variable and the dependent variables stipulated in the hypotheses, revealed that there were significant differences between the never lonely group, the once lonely group and the chronically lonely group for each dependent variable (See Table 12).

Table 12.

One-way ANOVAs Comparing the Never Lonely, Briefly Lonely and Chronically Lonely Groups for each Outcome Variable.

Variable	Components of Variability	Sum of Squares	df	Mean Square	F	Sig.
Moderate Activity Level	Between Groups	614.422	2	307.211	187.840	<0.005
	Within Groups	22571.375	13801	1.635		
	Total	23185.797	13803			
Smokes Now	Between Groups	9.408	2	4.704	27.606	<0.005
	Within Groups	1356.658	7962	0.170		
	Total	1366.033	7964			
Days/Week Drinks	Between Groups	516.495	2	258.247	59.900	<0.005
	Within Groups	59440.191	13787	4.311		
	Total	59956.686	13789			
Increase in Chronic Illnesses	Between Groups	9.520	2	1696.816	1338.982	<0.005
	Within Groups	3931.473	13691	1.267		
	Total	20743.463	13693			
Depression Score	Between Groups	3393.632	2	4941.474	2239.731	<0.005
	Within Groups	17349.830	13691	2.206		
	Total	40089.129	13693			
Number of Doctor Visits	Between Groups	16926.519	2	8463.260	23.488	<0.005
	Within Groups	4820819.9	13379	360.247		
	Total	4837746.4	13381			
Number of Nursing Home Nights	Between Groups	69985.256	2	34992.628	27.826	<0.005
	Within Groups	17341590.000	13790	1257.513		
	Total	17411575.000	13792			

The different lonely group means for each dependent variable are displayed in Table 13. The exercise scores were reverse-coded so it can be interpreted from this table that the chronically lonely group exercises less, on average. The means table also shows that those who were briefly lonely had less exercise than those who were never lonely. This briefly lonely group also had higher scores all other variables when compared to the never lonely group. The chronically lonely had more tobacco use, less alcohol use, a greater increase in number of chronic illnesses, more doctor visits, and more nursing home stays than both the never lonely and the briefly lonely.

Table 13.

Loneliness Group Means for Outcome Variables

Dependent Variable (n)	Group	n (%)	Mean
Moderate Activity (13,804)	Never lonely	10,308 (74.6)	2.84
	Briefly lonely	2,282 (16.5)	3.23
	Chronically lonely	1,214 (8.7)	3.47
Tobacco Use (7,965)	Never lonely	5,901(74.1)	0.20
	Briefly lonely	1,326(16.6)	0.27
	Chronically lonely	738(9.3)	0.29
Days/Week Drinks ETOH (13,790)	Never lonely	10,299(74.7)	1.20
	Briefly lonely	2,279(16.5)	0.82
	Chronically lonely	1,212(8.7)	0.65
New Chronic Conditions (13,812)	Never lonely	10,313(74.6)	0.26
	Briefly lonely	2,284(16.5)	0.30
	Chronically lonely	1,215(8.8)	0.34
Depression Score (13,694)	Never lonely	10,246(74.8)	2.62
	Briefly lonely	2,250(16.4)	3.44
	Chronically lonely	1,198(8.7)	4.16
Doctor Visits (13,382)	Never lonely	10,076(75.3)	9.71
	Briefly lonely	2,166(16.2)	11.36
	Chronically lonely	1,140(8.5)	13.40
Nursing Home Nights (13,793)	Never lonely	10,302(74.7)	1.74
	Briefly lonely	2,277(16.5)	4.54
	Chronically lonely	1,214(8.8)	9.31

Multiple comparison of the group means using Tukey's Honestly Significant Difference Tests were completed to discern where the three lonely groups differed. Significant differences existed when comparing the never lonely group with the chronically lonely group for each dependent variable (see Table 14). The chronically lonely group reported less exercise, more smoking, less alcohol use, a larger average increase in number of chronic conditions, higher average depression scores on the modified 7-item CESD, higher average number of doctor visits, and higher average number of nursing home nights when compared to both the once lonely group and the never lonely group.

Significant differences also existed between the briefly lonely and never lonely groups. Those who were briefly lonely reported less exercise, more tobacco use, more alcohol use, a larger increase in chronic conditions, higher depression scores, more doctor contacts, and more nursing home nights when compared to the group that was never lonely. There were not significant differences between the briefly lonely and the chronically lonely groups on four of the variables; tobacco use, alcohol use, new chronic conditions, and doctor visits.

Table 14.

Tukey's HSD Mean Comparisons of Lonely Groups for Each Outcome Variable

Variable	Group Comparisons	Mean Difference	Error	p
Moderate Activity	Never lonely vs. Chronically lonely	0.62885	0.03881	<0.005
	Briefly lonely vs. Chronically lonely	0.23885	0.04543	<0.005
	Never lonely vs. Briefly lonely	0.38401	0.02959	<0.005
Tobacco Use	Never lonely vs. Chronically lonely	0.08764	0.01612	<0.005
	Briefly lonely vs. Chronically lonely	0.01502	0.01896	0.708
	Never lonely vs. Briefly lonely	0.07262	0.1254	<0.005
Days/Week Drinks ETOH	Never lonely vs. Chronically lonely	0.54650	0.06305	<0.005
	Briefly lonely vs. Chronically lonely	0.17076	0.07382	0.054
	Never lonely vs. Briefly lonely	0.37575	0.04807	<0.005
New Chronic Conditions	Never lonely vs. Chronically lonely	0.08064	0.01618	<0.005
	Briefly lonely vs. Chronically lonely	0.03628	0.01895	0.135
	Never lonely vs. Briefly lonely	0.04436	0.01234	0.005
Depression Score	Never lonely vs. Chronically lonely	1.54810	0.03437	<0.005
	Briefly lonely vs. Chronically Lonely	0.72444	0.04026	<0.005
	Never lonely vs. Briefly lonely	0.82366	0.02621	<0.005
Doctor Visits	Never lonely vs. Chronically lonely	3.69064	0.59316	<0.005
	Briefly lonely vs. Chronically lonely	2.03495	0.69457	0.010
	Never lonely vs. Briefly lonely	1.65569	0.44957	<0.005
Nursing Home Visits	Never lonely vs. Chronically lonely	7.57801	1.07608	<0.005
	Briefly lonely vs. Chronically lonely	4.77722	1.26022	<0.005
	Never lonely vs. Briefly lonely	2.80079	0.82119	<0.005

Chi-square testing also revealed a difference between the never lonely, once lonely, and chronically lonely for moderate activity level, smoking status, drinking behavior, increase in chronic conditions, and depression scores (See Table 15). Only 4.7% of the chronically lonely group reported daily moderate activity compared to 6% of among those who were never lonely. Nearly half (49.8%) of the never lonely group reported exercising more than once per week. Only 33.1% of the chronically lonely reported exercise more than once weekly. Among those who were chronically lonely, 28.7% reported current smoking compared to only 20% in the never lonely group. Five percent of those who were chronically lonely reported daily alcohol intake compared to 8.3% of the never lonely. Twenty-two percent of the never lonely reported diagnosis of at least one new chronic illness since the 2002 interview, compared to 27.6% among the chronically lonely. Over fifty-five percent of the never lonely group had scores of zero on the 7-item CESD assessment for depression compared to 14.7% of the chronically lonely group.

Table 15.

Chi-Square Results for Loneliness Groups and Outcome Variables

Variable	Category	Never Lonely (%)	Briefly Lonely (%)	Chronically Lonely (%)	Chi-Square p-value
Moderate Activity Level	Every Day	622 (6.0)	120 (5.3)	57(4.7)	438.347, p<0.005
	>1/week	5,129 (49.8)	880(38.6)	402(33.1)	
	1/week	1,683 (16.3)	350(15.3)	159(13.1)	
	1-3/month	998 (9.7)	227(9.9)	111(9.1)	
	Never	1,876 (18.2)	705(30.9)	485(40.0)	
Smokes Now	No	4,723 (80.0)	965(72.8)	526(71.3)	54.852, p<0.005
	Yes	1,178 (20.0)	361(27.2)	212(28.7)	
Days/Week Drinks ETOH	Never	6816(66.2)	1,704(74.8)	965(79.6)	157.668, p<0.005
	1	1024(9.9)	192 (8.4)	95 (7.8)	
	2	561 (5.4)	95 (4.2)	40 (3.3)	
	3	457 (4.4)	89(3.9)	31 (2.6)	
	4	234 (2.3)	33(1.4)	10 (0.8)	
	5	236 (2.3)	32(1.4)	7 (0.6)	
	6	114 (1.1)	10(0.4)	4 (0.3)	
	Daily	857 (8.3)	124 (5.4)	60 (5.0)	
Increase in Number of Chronic Conditions	0	8,031 (77.9)	1,715(75.1)	880(72.4)	40.033, p<0.005
	1	1,959 (19.0)	469(20.5)	266(21.9)	
	2	288 (2.8)	85(3.7)	64 (5.3)	
	3 or more	35 (0.3)	15(0.7)	5 (0.4)	
Depression Score	0	19 (0.2)	10(0.4)	5 (0.2)	2471.768, p<0.005
	1	181 (1.8)	47(2.1)	13 (1.1)	
	2	6022 (58.8)	658(29.2)	180 (15.0)	
	3	2365 (23.1)	569(25.3)	207 (17.3)	
	4	1031 (10.1)	426(18.9)	275 (23.0)	
	5	444 (4.3)	337(15.0)	282 (23.5)	
	6	145 (1.4)	140(6.2)	167 (13.9)	
	7	39 (0.4)	63(2.8)	69 (5.8)	

Independent analysis of covariance tests were used to determine if the mean group differences between those who were never lonely, briefly lonely, or chronically lonely were still significant after controlling for the significant predictors from part one of the data analysis. The significant predictors included marital status, self-report of health, education, functional status, number of chronic illnesses, age, income, and number of people living in the household. Analysis of covariance test results concluded that even when controlling for these variables, there continued to be significant differences between those who were chronically lonely and those who were never lonely on five of the dependent variables. Those who were chronically loneliness reported less moderate activity level, more tobacco use, greater increase in number of chronic illnesses, higher depression scores, and higher average number of nights in a nursing home. After controlling for the aforementioned variables, those who were chronically lonely did not differ significantly from those who were briefly lonely or never lonely for number of doctor visits or for alcohol use (See Table 16).

Table 16.

Independent ANCOVAs for Loneliness Group Variable and Outcome Variables

Dependent Variables	Type III Sum of Squares	df	Mean Square	F	Sig.
Moderate Activity Level	43.306	2	21.653	14.977	<0.005
Current Smoking	3.817	2	1.908	12.172	<0.005
Days/Week Drinks ETOH	13.389	2	6.695	1.641	0.194
Increase in Number of Chronic Illnesses	6.531	2	3.265	11.654	<0.005
Depression Score	5837.513	2	2918.756	1506.046	<0.005
Number of Doctor Visits	379.362	2	189.681	0.557	0.573
Number of Nursing Home Nights	12183.271	2	6091.635	4.936	0.007

Note. Design: Intercept + Age + Marital Status + Number in home + Education + Self-Report of Health + Income + Number of Chronic Illnesses at Time One + Functional Impairment at Time One.

There were a total of ten hypotheses related to research questions one and two. The first two of these hypotheses were not supported since respondents with advancing age and female gender were not more likely to report loneliness. The remaining eight hypotheses were supported. Marital status, number living in the home, lower education, lower income, number of chronic illnesses, functional impairment, and poor self-report of health were explanatory of loneliness. Respondents who used home care were less likely to report loneliness.

There were seven hypotheses related to research questions three through nine. Five of these hypotheses were supported. There were significant differences between those who were never lonely, briefly lonely, and chronically lonely for the variables of activity level, smoking behavior, increase in chronic illness, depression scores, and nursing home stays. However, after controlling for the significant independent variables from part one of this analysis, respondents who were chronically lonely did not differ significantly from those who were never lonely on the variables of alcohol use or physician contacts. Table 17 gives a summary of the results as they relate to the study hypotheses.

Table 17.

Hypotheses Results

Hypotheses	Supported	Not Supported
Older persons will be more likely to report loneliness.		X
Females will be more likely than males to report loneliness.		X
Respondents who are non-married will be more likely than those who are married to report loneliness.	✓	
Respondents who live alone will be more likely to report loneliness.	✓	
Respondents with less than high school education will have a greater likelihood of reporting loneliness.	✓	
Lower household income will increase likelihood of reporting loneliness.	✓	
Higher numbers of chronic illness will increase likelihood of reporting loneliness.	✓	
Higher levels of functional impairment will increase likelihood of reporting loneliness.	✓	
Respondents with poorer self-report of health will be more likely than those who report "excellent" health to report loneliness	✓	
Use of home care will decrease likelihood of reporting loneliness.	✓	
Respondents who are chronically lonely will have less moderate activity than those who are briefly lonely or never lonely.	✓	
Respondents who are chronically lonely will have more tobacco use than those who are briefly lonely or never lonely.	✓	
Respondents who are chronically lonely will have more alcohol use than those who are briefly lonely or never lonely.		X
Respondents who are chronically lonely will have a greater increase in number of chronic illnesses than those who are briefly lonely or never lonely.	✓	
Respondents who are chronically lonely will have higher depression scores than those who are briefly lonely or never lonely.	✓	
Respondents who are chronically lonely will have more physician contacts than those who are briefly lonely or never lonely.		X
Respondents who are chronically lonely will have more nursing home nights than those who are briefly lonely or never lonely.	✓	

CHAPTER 5: SUMMARY, DISCUSSION AND IMPLICATIONS

Introduction

This study reports a longitudinal analysis of data from the Health and Retirement Study (HRS). The main focus of this research was to test two models which postulated sociodemographic and health-related risks for loneliness and potential outcomes associated with loneliness for United States older adults. The data used was from the RAND data file, version g, which was made publicly available on the HRS website in May 2007. This chapter presents a summary and discussion of the results of the analyses as well as implications for practice and recommendations for future research.

Statement of the Problem

It was recognized that there was a gap in the literature regarding how loneliness relates to the health of older adults in the United States. The purpose of this study was to address this gap through the testing of two models. These models contain selected variables based on a review of pertinent theoretical, qualitative and quantitative literature.

Review of the Methodology

Multiple statistical methods were used to complete the analyses. The sample included 13,812 community-dwelling United States residents, aged 50 and over. Statistical analysis was a multistep process that included exploratory analysis for descriptors of the sample followed by univariate and bivariate testing. Logistic regression was then used to evaluate the posited variables as predictors of loneliness. One-way ANOVAs, comparative means testing and analysis of covariance tests were used to evaluate the differences between those who were never lonely, briefly lonely, or chronically lonely.

Study Limitations

Several factors limit the conclusions that can be drawn from this study. First, the major disadvantage is that all of the variables were self-reported by telephone interview. The second is that the cross-sectional regression analysis for risks of loneliness limits the ability to establish any causal relationships since all variables were reported through the same interview at the same time. However, several of the variables were time-constant such as education and gender, and the health related variables were asked in such a way that they would be reflective of the prior two years experiences. The dichotomous self-report measure of loneliness could be considered a limitation although correlation of self-report measures of loneliness with various loneliness scales, as well as the continued use of self-report for current studies of loneliness supports the use of this measure. Cultural differences have been shown to exist when researching loneliness (Rokach, 1999) which limits the generalizability of this study to those other than this sample who are community-dwelling United States residents, aged 50 years and older. The two variables of marital status and number living in the home were used as a reflection of social support for this study. A more comprehensive measure of social support may have been helpful.

Major Findings

Prevalence of Loneliness

The results for this study show that loneliness is a significant problem for U.S. older adults with 16.9% of respondents reporting loneliness at time one (2002) and 8.8% reporting loneliness at time one (2002) and time two (2004). This prevalence rate is lower than that reported by Cox and colleagues (1988) who reported that 29% of the young-old in their sample of Midwestern U.S. adults experienced loneliness. This prevalence rate is also lower than Australia where prevalence has reported at over 30% (Lauder et al., 2004; Steed, Boldy,

Grenade, & Iredell, 2007), the Netherlands where prevalence has been cited at over 25% in multiple studies (Holmen, et al., 1992; Moorer et al., 2001; Savikko, et al., 2005; Van Baarsen, 2001), and Great Britain where prevalence was cited at 31% (Victor et al., 2005). These prevalence differences may be attributed to some difference in sample ages. Cox and colleagues (1988) studied a sample that ranged in age from 59-101 years with a mean age of 76.6 years. Steed and colleagues (2007) also studied an older sample that ranged in age from 65 to 85 years with a mean age of 77.5 years. The reports from the Netherlands also had samples with higher mean ages. However, the current study still found a prevalence rate lower than Lauder and colleagues (2004) whose sample had a mean age of 45 years (SD 15.44).

Risks of Loneliness for U.S. Older Adults

Eight of the ten variables hypothesized as risks for loneliness did have explanatory value as predictors of loneliness. Non-married status, poorer self-report of health, lower education levels, functional impairment, increasing number of chronic illnesses, age, lower household income, and less people living in the home were all found to increase the likelihood of self-report of loneliness. Gender did not remain in the model as a predictor of loneliness with this sample.

The primary predictor of loneliness was non-married status. This finding is in agreement with Lauder (2004) who reported that marital status was predictive of loneliness in an Australian sample. Hector-Taylor (1996) also reported similar results, when studying New Zealand older adults, that widowhood, separation or divorce were all predictors for state or trait loneliness. Additionally, the findings in this study are consistent with multiple other studies that emphasize marital status as having an important relationship to loneliness (Berg et al, 1981; Larson, et al., 1985; Liang, Brown, Krause, Ofstedal, & Bennett, 2005; Pinquart, 2003; Savikko et al., 2005). These results do differ from Mullins (1996) who studied a sample of Florida older adults and

reported that marital status had no impact on expressed loneliness. They are also inconsistent with Kim (1999) who reported that for Korean older adults, marital status was not a predictor.

Finding that poorer self-assessment of health increased likelihood of loneliness is consistent with multiple past studies (Holmen et al., 1992; Mullins & Elston, 1996). Similarly, Cox reported that loneliness had a strong association with perceived health status. Berg (1981) also found that lonely Swedish older adults reported negative assessment of health.

Education was the third highest predictor in the analyses. The importance of education as a predictor is consistent with reports from other countries that lower education was predictive of loneliness (Hector-Taylor et al, 1996; Victor et al., 2005). However, Berg (1981) reported that loneliness was not significantly associated with education.

Cohen-Mansfield and colleagues (2007) did find that mobility difficulties were an important predictor of loneliness which is consistent with the findings from this study. These results are also consistent with five other studies (Dykstra et al., 2005; Kim, 1999; Mullins & Elston, 1996; Piquart, 2003; Savikko et al., 2005). They are also supportive of McGinnis' (2001) qualitative study reporting that fear of dependency was a part of loneliness. These findings are in conflict with Bondevik (1998) who found that those who experienced a decline in functional status reported less loneliness.

Number of chronic illnesses was an important predictor for loneliness in this study. This is consistent with multiple prior studies (Dykstra et al., 2005; Savikko et al., 2005). Similarly, Victor (2005) reported that poor current health was a risk factor for loneliness for older adults in Great Britain.

Advancing age being linked to less loneliness was surprising and it is contradictory with other research that evaluated the relationship of age to loneliness (Dykstra et al., 2005; Victor et

al., 2005). Holmen (1999) found that advancing age was related to loneliness but reports that this effect levels off at age 90, indicating that the old-old group may stabilize at some point with regards to loneliness. Perhaps, the broad age range of the sample in combination with the old-old group could explain this finding.

Those who were impoverished were more likely to report loneliness in this study. This is consistent with multiple other studies that have linked poverty to loneliness (Cohen-Mansfield et al., 2007, Hector-Taylor et al., 1996; Mullins et al., 1996; Savikko et al., 2005). The significant results from this study were from the poorest group, those making less than \$18,000.00 per year.

Respondents who lived in homes with other people were less likely to report loneliness. This finding was only marginally significant and was the least important predictor of loneliness. This result is in agreement with Savikko and colleagues (2004) who also found that living alone for seniors in Finland was predictive of loneliness. These results contradict Mullins (1996) who reported that living alone was not directly related to loneliness. Mullins (1996) reported that those with no friends were more likely to be lonely. Hector-Taylor (1996) differentiated between state and trait loneliness and found that living alone was predictive of state loneliness but not trait loneliness. It is possible that the relationship between state loneliness and living alone is reflective of some other life transition such as being widowed.

Use of home care was not explanatory of loneliness. This result may raise the question regarding who uses homecare. The use of home care also did not correlate highly with functional impairment or number of chronic diseases. Those who use home care have been reported in other studies to have more frequent social contact and it has been theorized that this is why they may report less loneliness (Bondevik et al., 1998).

Outcome Differences by Loneliness Status for Older U.S. Adults

The results of this current study contribute to the knowledge base regarding health-related outcomes reported by those who report experiencing loneliness. Previously, loneliness had been reported as a negative influence on physical health and positive health practices, and to be a predictor of lower quality of life (Ekwall et al., 2006; Yarcheski et al., 2004). The current analyses found that those who reported loneliness at both time intervals, the chronically lonely group, reported less frequent moderate activity, more smoking, greater increase in number of chronic illnesses, higher depression scores, and more nursing home stays. The chronically lonely group was not more likely to use alcohol or visit the doctor more frequently.

The findings from this current study regarding activity level, tobacco use, and nursing home stays have some commonalities and some differences with past research. The finding that those who are chronically lonely exercise less is contradictory to Lauder (2006) who reported that the lonely and non-lonely groups, in his sample, did not differ significantly on activity level. In this case, the difference could be related to sample age since Lauder's sample had a mean age of 45 years (SD 14.55). There is a consistent link between loneliness and current smoking cross-culturally (Lauder et al., 2006). The relationship between the chronically lonely and number of nursing home stays is similar to results from Russell and Cutrona (1997) who reported that loneliness was predictive of nursing home admission. Whether this is due to loneliness precipitating mental and physical decline or if the admission is due to lack of social support or caregivers at home still needs to be clarified.

Those who were chronically lonely had a greater increase in number of chronic illnesses and higher depression scores when compared to those who were briefly lonely or never lonely. These results are consistent with prior reports that loneliness is a stressor that may impact

chronic disease (Cacioppo et al., 2000; Cacioppo et al., 2002; Sorkin et al., 2002; Strike et al., 1004). Conversely, belongingness support has been reported as having a positive relationship with health outcomes for chronic illnesses including diabetes, hypertension, arthritis, and emphysema (Tomaka et al., 2006). Other reports that have shown loneliness to be linked with negative mood and pessimistic views (Jones, Hobbs, & Hockenbury, 1982). The link between loneliness and depression has been well established (Alpass & Neville, 2003; Barg et al., 2006; Cacioppo et al., 2006). Depression, in turn, has been linked to diminished reports of well-being (Cacioppo et al., 2006) and reduced quality of life in the older adult (Netuveli, Wiggins, Hildon, Montgomery, & Blane, 2006). Cohen-Mansfield (2007) and colleagues tested a model of the path of loneliness to depression using a sample of 161 residents of an independent-living community and reported that level of loneliness was the most important predictor for depression. These study results are also similar to the qualitative results from Barg (2006) who reported that older persons view loneliness as a prodrome to depression.

Unanticipated Findings

There were four unanticipated findings in this study regarding the relationship of loneliness to age, gender, doctor contacts, and alcohol use. The finding that as age increases, the respondent was less likely to report loneliness was surprising. The age variable was a continuous variable with a range of over fifty years. Future studies focusing on age groups, such as the pre-retirement group, the young-old, and the old-old could lead to an explanation of this finding. It is possible that as people pass through different life transitions, they confront and resolve issues that may contribute to loneliness.

Although prior research had indicated that gender may have a relationship with loneliness and that loneliness is more prevalent in women, female respondents were not more likely to

report loneliness. The gender issue is a contradictory issue. Mullins (1996) previously reported that loneliness was more prevalent among men in his sample of Florida older adults. It has been reported that women are more likely to self-label loneliness than men (Borys & Perlman, 1985). Borys (1985) further reported that lonely men were more likely to be socially rejected than lonely women. This could mean that women are more likely to admit loneliness because they do not suffer the negative social consequences that men suffer.

The results of this study, regarding the number of doctor visits, are inconsistent with the literature review. Past reports indicated that those who were lonely had more physician visits than those who were not lonely (Ellaway et al., 1999; Geller, 2000, Geller, Janson, McGovern, & Valadini, 1999). Berg (1981) also reported that Swedish older adults use more outpatient care as well as more social welfare programs. Perhaps this difference exists due to the very large sample size of the current study. Other studies of loneliness and physician visits reported samples as high as 691 and still reported a positive relationship between loneliness and visit frequency.

Loneliness was not linked in this study to increased alcohol consumption after controlling for the predictors of loneliness. This is inconsistent with Thauberger (1985) who reported that loneliness was associated with more alcohol use.

Discussion

The current study supports that sociodemographic and health-related variables could be used to predict loneliness. It also supports the idea that health outcomes differ by loneliness categorization.

Rokach (2001) found that the experience of loneliness as well as the perception about what causes loneliness may depend on culture and background. Rokach (2001) found that when North Americans from Canada were compared to Spaniards, North Americans scored higher on

emotional distress, social inadequacy and alienation, growth and discovery, interpersonal isolation and self-alienation. The North Americans lived in a more individualistic society than the Spanish society which encourages maintenance of family ties and family interaction and discourages divorce. Kim (1999) also did address the cultural issue in relation to loneliness and found that those with strong "ethnic attachment" were less likely to be lonely. It is possible, in this case, that the perception of "ethnic attachment" played a part in meeting the belonging need for this sample. Since Kim's (1999) sample was from New Mexico, it is possible that there are subcultures or pockets of different ethnicities within the United States that are not as individualistic.

Rokach (2001) further concluded that the loneliness experience also differs by gender. While the results of the current study did not include gender as predictive of loneliness, it is still possible that men and women experience loneliness differently. There is less gender bias in a society such as the U.S. that has focused on a foundation of equal rights. It is also possible that the interaction of age and gender has limited the gender effect. The gender biases common to younger people, such as job opportunities, income, and child-rearing responsibilities, may no longer be a problem for the age group included in this Health and Retirement Study sample. Unfortunately, the lasting effects of these biases, which impact both income and education, seem to continue into older age, as education and income were both explanatory of loneliness. It is also possible that women consciously seek more social activity while men may be more self-alienating (Rokach, 2001).

The issue of marital status is important given the aging U.S. population and the high divorce rate. Marital status has been reported as being related to number of social contacts, quality of social contacts, social support, and social network size (Nezlek et al., 2002; White et

al., 2002). Loss of spouse for older adults can lead to social disengagement from other people. Not only self-disengagement while grieving but also disengagement from social networks such as the spouse's relatives or those who were perceived as mainly the spouses friends and social contacts.

The issue of quality of relationships versus quantity of relationships is contradictory. A person's social network needs to include relationships of desire, not just relationships of necessity. The marital relationship is typically one of desire and the loss of it can place the older person in a state of long-term grief. Stevens and Westerhof (2006) reported that for both men and women, relationships beyond the marriage helped to lessen loneliness. The quality of the marital relationship has been emphasized by more recent reports that those with positive social interactions within the marriage report greater psychological well-being (Nezlek et al., 2002). Barbour (1993) reported that loneliness correlated negatively with every measure of intimacy within a marital relationship. In other words, the quality of the relationship may be most important. This would be congruent with Kim's (1999) finding that "satisfaction with support" was the greatest predictor. These findings lend support to the conceptualization of loneliness as an integrated individualized perception of one's own individual needs, health status, and assessment of social relationships (Peplau et al., 1982). Viewing loneliness in this way would lead one to conclude that loneliness may be very amenable to interventions.

The findings regarding functional status are consistent with the individualized culture of the United States. Pinqart (2003) reports that for those who are divorced, widowed, or never-married, functional status is more important as a predictor of loneliness than in those who are married. This seems logical since the likelihood of this group living alone and needing to be able to be self-sufficient is higher than those who have the support of a marital partner.

Social network and number of social contacts have been shown to have a relationship with loneliness. Older adults with larger social networks, more income, and more education had better reported health status and reported less loneliness (Cox, Spiro & Sullivan, 1988). Those with larger social networks are more likely to have an increased number of social contacts as well as a better chance of having or experiencing a satisfying social interaction. Moorer and colleagues (2001) reported conflicting results. While 19% of their older adult sample reported loneliness, social network size had a negative correlation with loneliness.

It is important to remember that for some older adults, the number living in the home may not be as important as active involvement in the community as well as social network size. Studies have shown that there is some strength in even weak ties to the community. Tilburg (1998) reported that the Dutch were less lonely than the Tuscans even though the Tuscans tended to live with extended family. This difference was accounted for by social network size and increased volunteer activities in the community (Tilburg, et al., 1998). Glass and colleagues (2006) also reported that increased social engagement was associated with less depression. The number living in household likely has a direct effect on extent of social engagement since it is known that those who live alone spend more time alone than those who live with others (Hector-Taylor & Adams, 1996). However, if there is an excessive burden on the older adult due to a large number living in the home or due to excessive caregiver responsibilities for extended family, the number could be a stressor.

When considering income, it is important to note that the U.S. is a rich country and that the mean household income for this U.S. sample was over \$50,000 per year with a median income over just over \$30,000.00. Compared to other countries, this high mean and median income may be why the poorest group had more loneliness. Poverty limits one's ability to

socialize, travel, take part in events, and even to eat properly. It also affects one's ability to afford needed medications and healthcare which could then lead to worsening illness. When evaluating the results of the current study, those respondents who had an income over the median value of \$34,057.00 per year were actually less likely to report loneliness. It was mainly those who are in the lowest income quartile of less than \$18,000 per year who were at an increased risk for loneliness.

Health behaviors differed between those who were never lonely and those who were chronically lonely. In the case of exercise, it would be important to consider the community in which the older adult lives as well as lifestyle and motivation level behind the exercise. Many people prefer to exercise indoors or with other people. Older adults with functional impairment may be fearful of walking alone or may not have a place that is safe to walk without increasing their risk for falling. Since it is known that exercise can have a positive effect on mood, functional ability, and chronic disease management, emphasizing exercise for older adults as a positive health behavior is essential.

Tobacco use can easily be a solitary activity and is sometimes an activity that people prefer to do alone and without scrutiny of non-smokers. The higher use of alcohol by those who were never lonely could lead one to speculation that even in this age group, drinking alcohol continues to have social implications. This could have positive or negative consequences depending on how heavily a person is drinking. If the main social outlet centers on alcohol drinking or tobacco use, clients may not be willing to limit their substance use for fear of losing their social group.

The two illness outcome measures of new chronic illnesses and depressive symptoms the idea of loneliness as a physiological stressor requiring intervention. Increases in chronic illness

could lead to more functional impairment or even earlier mortality if the illness is a stroke, myocardial infarction, cancer or serious lung disease. The occurrence of depression could eventually lead to suicidal ideation or risk if not adequately treated, as well.

When thinking about how the healthcare utilization variables related to loneliness, it is important to identify increases in healthcare costs. It is possible that in the past, when other studies reported this increased healthcare usage, people attended clinics more often but now, due to rising healthcare costs and changing reimbursement issues, people are being more prudent about scheduling healthcare appointments. The cost of nursing home nights are so expensive that people may simply not be able to afford to stay as long as they would like to, or they may not be allowed to stay even if they wanted to, due to insurance regulations. When looking at the distribution of the nursing home nights for this current study, the Medicare time limitations for skilled nursing units may be explanatory since over half of those who stayed in a home did not stay over ninety days.

It is fairly well established that loneliness is a psychological stressor that can elicit a physical stress response (Adam et.al., 2006). It may be that this stress response is impacting the number of chronic diseases. It has been presently demonstrated that stress responses are related to heart disease, hypertension, and depression (Orth-Gomer et.al., 1988). There has also been a link between depression and dementia, and now there is one small study that reports a link between loneliness and Alzheimer's disease (Wilson,et.al. 2007). It is important that future nursing practice and research center on the development of interventions that can be helpful to those who suffer from loneliness.

Study Findings and the Neuman Systems Model

The major findings of this study imply that specific health-related factors put a client at risk for loneliness. Neuman's model emphasizes that the major nursing perspective involves assessing potential stressors for a client so that the nurse can identify actions to help the client system maintain optimal health. Nurses who focus on assisting clients to prevent chronic disease, maintain functional status, or improve health perception may be helping that client to avoid the stressor of loneliness.

Given that these study results also show that those who are chronically lonely report less exercise, more cigarette use, more chronic illnesses, and higher depression scores, targeting prevention techniques as interventions would be appropriate and consistent with what Neuman's prevention as intervention format (Neuman et al., 2002). In this format, Neuman emphasizes that primary prevention efforts should identify stressors and then education, support and motivate toward wellness. Neuman (2002) further suggests that through secondary prevention efforts, nurses should recognize that a stressor may have impacted a client and should again mobilize resources to return the client to a stable state. For those clients who do suffer loneliness and may have suffered a negative outcome related to this loneliness, tertiary prevention efforts could be put into place which would include smoking cessation, chronic disease management, depression treatment, exercise interventions, and possibly the use of home care to allay nursing home stays. Overall, the Neuman Systems Model is appropriate as a guide for developing potential interventions for loneliness.

Clinical Practice and Research Implications

Implications for Nursing Practice

The results of this study have implications for clinical nursing practice at the national, community, and individual level. Loneliness as a health problem for older adults is part of nursing's domain. Understanding loneliness as a unique phenomenon that could adversely affect the health of an individual is imperative for nurses. Addressing the problem of loneliness is crucial for those nurses who care for our aging population. Consistently research studies have suggested that nursing and other healthcare fields make loneliness a priority (Donaldson, et al., 1996; Paul et al., 2006; Ryan & Patterson, 1987).

It is important to remember that loneliness has been reported as the single most important predictor of psychological distress (Paul et al., 2006). The results of this current study demonstrate that those who are chronically lonely have different outcomes than those who are never lonely or briefly lonely. This should lead nurses to conclude that loneliness needs to be assessed and treated so that it does not become a chronic problem. These practice implications could be based on Neuman's Systems model and aimed at helping the client build specific defenses against loneliness.

Nationally, with a prevalence rate of 16.9% for loneliness, nursing organizations could consider both an educational effort as well as emphasis on screening for those aged 50 and over. A national education awareness campaign about the problem of loneliness as well as the negative outcomes associated with loneliness may help to reduce stigma that is often associated with psychological and social problems. In a highly individuated culture such as the U.S., loneliness may be perceived as a sign of weakness and shame may be associated with the problem. This type of stigma can affect help-seeking behavior. Additionally, primary care professionals have

been shown in one qualitative study to harbor negative views of depression in the older adult and be hesitant to offer medication for what they may believe to be the result of either loneliness or diminished socialization (Murray et al., 2006).

Screening could be accomplished quickly. It should be a reimbursable part of either the health history or comprehensive geriatric assessment. This may seem like a sweeping recommendation but screening is routinely recommended and reimbursable for other psychological problems, such as depression. Given the negative stigma, routine screening for the problem of loneliness may be the only way to accurately assess the problem. Screening through active questioning should help in identifying the lonely so that interventions could be put into place prior to the development of negative outcomes such as depression.

There is some evidence to suggest that community based programs can be successful in diminishing loneliness. Programs such as the Seniors CAN program have also shown to promote health in seniors while decreasing loneliness (Cohen et al., 2006; Collins & Benedict, 2006). Seniors CAN is a 16-week interventional educational program that is designed to promote health and quality of life as well as improve social network. This type of intervention is a multi-strategy intervention aimed at cognitive restructuring as well as improvement of social network and social skills. Other programs, such as the community-based study measuring the impact of a cultural singing program on the physical health, mental health, and social activities of Washington D.C. older adults reported that the intervention group reported improved self assessment of health, fewer doctor visits, fewer falls, and decreased loneliness (Cohen et al., 2006). Andersson (1985) demonstrated that a social intervention for 207 older women could be successful. The institution of community group meetings involving discussion of pertinent issues

such as social and medical services resulted in the women reporting less loneliness, lower blood pressure, and less feelings of meaninglessness.

Interventions that assist the older adult in expanding their network could help with the problem of loneliness. Nurses could use their knowledge of the community to connect clients to services so that they can expand their social network. Dykstra and colleagues (2005) reported that expansion of social network led to less loneliness. Social interventions that increase activity in community organizations such as churches and religious groups may protect from self-alienating behavior, as they have in youth. Hawkley recently reported (2003) that in young adults, loneliness predicted higher stress appraisals and poorer social interactions. Social support mediated these differences with no difference between men and women. (Hawkley, Burleson, Berntson, & Cacioppo, 2003) Additionally, social support interventions through the use of support groups have been shown to decrease social isolation and emotional loneliness in widows (Stewart, Craig, MacPherson, & Alexander, 2001)

Nurses should also approach the problem of loneliness on an individualized level with their clients. Awareness of the risks for loneliness and the negative outcomes associated with loneliness should prompt nurses to assess clients and give the appropriate nursing diagnosis of loneliness. Care planning for the individual should encompass appropriate interventions that will help the person minimize risks through patient education about the problem of loneliness, appropriate chronic disease management, appropriate referrals to maintain or improve functional status, referrals for service to address the problem of poverty, community referrals to enhance social network, and the encouragement of ongoing education or exploration of new learning opportunities. Through individual intervention and appropriate referrals for services, nurses can help to prevent the negative sequelae reported with loneliness.

Implications for Nurse Educators

One way to ensure that future nurses and clinicians are aware of the significant problem of loneliness for the older population would be to integrate the topic into geriatric curriculums for health and social science students. Routinely including discussion of the problem in texts and practice guidelines would be helpful.

Recommendations for Further Research

There is a tremendous void in the healthcare and social science literature when it comes to identifying concrete successful interventions against loneliness. This void may be inhibiting practitioners from translating their thoughts of loneliness from a psychological and social problem to that of a significant health problem that can be effectively treated. Future research should evaluate the utility of multi-faceted community and individual interventions that focus on assessing and treating the individual. This type of research could lead to some concrete evidenced-based guidelines for the treatment of loneliness which would be helpful from a primary care standpoint.

Since loneliness is a significant psychological stressor and a prodrome to depression (Cacioppo et al., 2006), it is possible that experimental treatment interventions could include a medication. Medications such as Sertraline, a selective serotonin reuptake inhibitor, have been routinely used for anxiety and depression and have more recently been reported to improve symptoms associated with social anxiety disorder (Connor, Davidson, Chung, Yang, & Clary, 2006). It is possible that people who are chronically lonely may improve with medication that treats the stress or depressive symptoms associated with loneliness.

Counseling interventions that aim at cognitive restructuring could potentially be helpful as a way of combating loneliness. Harboring negative self-views may make a person less

desirable to socialize with and consequently limit their ability to improve social contacts (Jones et al., 1982). Negative self-assessments may be due to disappointments over past accomplishments. Seniors are in a developmental process of life review and counseling may be helpful if there is rumination over regrets or life disappointments.

An exercise intervention could possibly minimize risk for loneliness as well as improve negative outcomes associated with loneliness. Dykstra and colleagues (2005) reported that improvement in functional capacity led to less loneliness. Through an active exercise program, seniors could improve their health perception, maintain functional status, and improve the management of chronic diseases such as arthritis, diabetes, and hypertension. Since number of chronic diseases, functional impairment and self-report of health were all predictors for self-report of loneliness, it reasons that an exercise-based intervention may be helpful. A regular exercise program may improve depression, and could eventually impact living situation through its effect on functional ability.

Interventional research that improves community embeddedness or increases the number of social contacts through a number of methods may be helpful. Research evaluating the effectiveness of the following community-based interventions for loneliness could further expand treatment options for loneliness.

1. Program with regular phone contact.
2. Actively increasing attendance at community events.
3. Actively increasing attendance at faith-based events.
4. Seeking involvement or increasing involvement in senior centers.
5. Returning to work or seeking volunteer opportunities related to prior career.

6. Proactively reconnecting with neighbors and conscious maintenance of positive family connections.

7. Internet interventions to increase social network size and number of contacts. Internet training for the older adult has shown to result in a trend toward less loneliness and less depression.

(White et al., 2002)

8. Using new educational opportunities as a way of improving self-efficacy. Many colleges now have programs that encourage older students to return to pursue a new topic or reacquaint themselves with a prior interest.

Finally, further research exploring the relationship of personal creativity to loneliness could provide evidence for forms of self-help therapy. Austin studied 206 healthy older adults and revealed that creative potential was significantly inversely correlated with loneliness for men and women over 65 (Austin, 1984). Activity-based approaches centered on enhancing creativity could be viewed in the framework that mood and activity level are related. Encouraging the development of solitary creative activities could improve self-efficacy. Fry (2002) studied a sample of Canadian older adults, aged 65 to 86 years and reported that self-efficacy beliefs were a strong predictor of loneliness. Cohen and colleagues (2006) reported that participation in a chorale group diminished loneliness. Creativity interventions could be studied as individual or group interventions through the use of art, theater, or music classes.

Conclusion

Loneliness is a prevalent psychological problem for U.S. older adults with its own unique health-related risks and outcomes. Given the prevalence, it should be considered a healthcare priority for nurses in the United States. Considering screening both for risks of loneliness and for loneliness as part of routine health histories for those aged 50 and over would be prudent. Future

research needs to focus on evaluating the effectiveness of both prevention and treatment interventions for loneliness in an effort to create an evidence base for older adults.

APPENDIX A: TABLES

Table 1

Empirical Research of Loneliness and the Older Adult

Author Year Country	N	Sample Description	Pertinent concepts	Loneliness Measure	Findings
Berg, 1981 Sweden	1,007	70 year-old Swedish	Descriptive study of loneliness and its relationship to social and medical conditions	Self-Reported as never, rarely, sometimes, or often and then dichotomized for coding as lonely/not lonely.	Loneliness in 25% of women and only 12% of men. Loneliness assoc. with widowhood decreased social contact, depressed mood, and negative self-assessment of health, somatic complaints, & psychiatric symptoms
Kiecolt- Glaser, et.al. 1984 Ohio U.S.	36	Aged 18-52 Psych Inpatients 21 female 12 male	Correlational study of loneliness and multiple physical measures	UCLA Loneliness Scale	Significant association between high loneliness and lower natural killer cells and higher urinary cortisol.
Thauberger 1985 Canada	301	Aged 14-83 Canadian	Loneliness and substance abuse	Avoidance of Ontological Confrontation of Loneliness Scale	Significant relationship between prevalence of loneliness and ETOH and stimulant use. Those who confronted loneliness had less medication and hard drug use.

Author Year Country	N	Sample Description	Pertinent concepts	Loneliness Measure	Findings
Andersson 1985 Sweden	207	Swedish Mean age 77, Women in congregate housing	Group Intervention for loneliness	4-item UCLA Loneliness Scale	Group intervention of small neighborhood sessions improved the prevalence of loneliness, even 6 months after the intervention—people improved their own network after initial contact
Larson, 1985, Canada	92	Retirees, mean age 68 40 men, 52 women,	Loneliness and time spent alone	Self Report of affective state when alone	Those who lived alone spent 48% of their time alone, and reported more fatigue, passiveness, boredom, and feelings of lifelessness
Cox et. al 1988 Chicago Illinois	379	Community based older adults	Impact of social risk factor on older adult perceived health	Two self-report measures, I am lonely, and I feel lonesome, measured on likert scales were used. The two had a correlation coefficient of 0.8. One used in analysis, the other used for validation purposes.	Older adults with larger social network, more income, and more education had better reported health status and reported less loneliness.
Walker et. al, 1991, Tennessee U.S.	61	Community based older 54 women	Explored the relationship between loneliness and nutrition	UCLA Loneliness Scale, food diaries, social contact diaries	Positive correlation between loneliness and decreased intake of protein, iron, phosphorus, riboflavin, niacin, and ascorbic acid

Author Year Country	N	Sample Description	Pertinent concepts	Loneliness Measure	Findings
Berkman, et.al. 1992 Conn. U.S.	194	Over the age of 65 100 men 94 women	Examined the relationship between emotional support and surviving an MI	EPESE data	Patients who lacked emotional support were 2.9 times more likely to suffer a 6- month mortality
Holmen et. al., 1992, Sweden	1725	Swedish Community- living, metropolitan area, aged 75-101	Compared loneliness to social network and health	Self-Reported loneliness as often, sometimes, seldom, or never, then dichotomized as lonely/non- lonely	38% of women had loneliness, 24% of men had loneliness, escalated with age until 90, loneliness correlated with perceived poor health
Andersson 1993 Sweden	267	Age 65-74 44% men, 56% women	Early attachment to e wellbeing	Subscales from attachment theory and social integration	Men were more lonely, but had less psychosomatic symptoms, and better subjective health-
Barbour 1993 Colorado U.S.	467	Community based couples	Marriage and Loneliness	UCLA Loneliness scale and 10 other scales on family functioning	Loneliness was significantly and negatively correlated with every measure of intimacy in marriage. Quality of the relationship important
Hector et. al. 1996 New Zealand	505	Community based seniors	State versus trait loneliness	UCLA Loneliness Scale	State loneliness correlated with insuff. Income, low education, living alone. Trait loneliness correlated with recent death of spouse

Author Year Country	N	Sample Description	Pertinent concepts	Loneliness Measure	Findings
Mullins et. al. 1996 Florida U.S.	1071	72% female, 84% Caucasian Mean age 75 years	Examined a social support model and loneliness	DeJong- Gierveld Loneliness	Men were more lonely Disability related to loneliness, Poor subjective health rating associated with loneliness, 49% reported having no friends.
Rokach 1996 Canada	679	Canadian From 3 cultures, North American, south Asia, and West indies	Examined loneliness with reference to culture	The Loneliness Questionnaire, developed by Rokach	South Asia more interpersonal isolation and alienation. All cultures reported similar self- alienation. Speculated may be response to pain or longing for acceptance.
Rokach 1996 Canada	633	295 men, 338 women, age range from 13 to 79	Identifying coping mechanisms associated with loneliness	The Loneliness Questionnaire and coping strategies by self-report	Acceptance, reflection, increased activity, and social interaction are effective coping, Avoiding confronting loneliness not helpful.
Rokach 1997 Canada	633	Same as previous study	Examining perceived causes for loneliness	The Loneliness Questionnaire and causes by self-reports	Unfulfilling intimate relations, separation from significant other, and social marginality identified as causes

Author Year Country	N	Sample Description	Pertinent concepts	Loneliness Measure	Findings
Rokach 1997 Canada	633	Same as previous study	Examined marital status on experience of loneliness, focus on if marriage terminated	The Loneliness Questionnaire and self-reports about marital status	Men reported social isolation more than women, which differed from general population. Those that were married and lonely, ranked it as excruciating.
Russell et. al. 1997 Iowa U.S.	3000	Rural IOWA portion of EPESE	To study the relationship between loneliness and nursing home admission	4-item UCLA	Loneliness did increase the likelihood of nursing home admission.
Tilburg et. al. 1998 Netherlands	6058	Stratified Random sample, 2 groups, mean age 71.5	Loneliness and Social Integration compared Dutch vs. Tuscans	DeJong- Gierveld loneliness Scale, compared to indicators of social integration , Dutch used UCLA Loneliness scale	The Dutch had a higher level of social integration and they were less lonely, even though the Tuscans lived most often with family.
Bondevik et.al. 1998 Norway	221	Aged 80- 105	ADL status, social contacts effect on loneliness and social relationships	Katz ADL and Revised Social Provisions Scale,	Decline in ADL status and need for assist reported less loneliness. Likely they had more social contact based on need. Those who were independent reported more loneliness.

Author Year Country	N	Sample Description	Pertinent concepts	Loneliness Measure	Findings
Ellaway et. al. 1999 Scotland	691	318 aged 40 373 aged 60	The relationship of loneliness to health care visits	Assessed loneliness and number of visits over a 12 month period	Those who were significantly lonelier had twice as many visits to general practitioner.
Geller 1999 California U.S.	164	Aged 17 and up	Do lonely people use the ED more often	UCLA Loneliness scale	Lonely patients were 60% more likely to visit the ED than their non-lonely counterparts
Kim et. al. 1999 Korea	110	60 and older Women	Find what predicts loneliness in Korean women living in the U.S.	UCLA Loneliness Scale	Satisfaction with social support, social network size, ethnic attachment, and functional status predicted loneliness. Satisfaction of social support was best predictor
Rokach 2000 Canada	711	Canadian, aged teenage to very old, 70% men, 30% women	Examine coping strategies throughout the lifespan	The Loneliness Questionnaire	Social network assoc. with decreased loneliness, being active in the community assoc with less loneliness, religion expressed as a strategy for coping with loneliness

Author Year Country	N	Sample Description	Pertinent concepts	Loneliness Measure	Findings
Moorer et. al. 2001 Netherland	723	Mean age 74.6	Examine if neighborhood size had an impact on social network and loneliness.	DeJong- Gierveld Loneliness Scale	Higher income, larger social network and better subjective health was related to less loneliness. High incidence of loneliness again, 19 % moderately lonely, 9% severely lonely, Neighborhood size not directly related to loneliness. Widowhood and living alone was associated with loneliness.
Van Baarsen 2001 Netherland	4063	Aged 55-89, evenly divided men and women, convenience	Focused on the bidimensionality of loneliness as emotional and social	DeJong- Gierveld Loneliness Scale	Findings support that loneliness is bidimensional, 25% moderately lonely.
Rokach 2001 Canada and Spain	1091	637 Canadians and 454 Spaniards	To evaluate the influence of cultural background on the experience of loneliness	The Loneliness Questionnaire and reports on the experience of loneliness	Canadians consistently lonelier than the Spaniards.
Cacioppo et. al. 2002 Illinois United States	114	U.S. 89 college students, compared to 25 older adults	Physiological measures associated with loneliness	UCLA Loneliness Scale	Loneliness associated both with sleep disturbance and deregulation along with increased total peripheral resistance.

Author Year Country	N	Sample Description	Pertinent concepts	Loneliness Measure	Findings
Fry et. al. 2002 Canada	242	Canadians, age range from 65 to 86	To discover if self-efficacy beliefs serve as predictors for loneliness	Initially measured on scale of often, sometimes, never. Also measured on self-report likert from not at all to often. Finally measured on 6- item subscale from the Philadelphia Geriatric Center Morale Scale.	Self-efficacy beliefs were a stronger predictor of loneliness and distress than their sociodemographic characteristics.
Nezlek et. al. 2002 U.S.	113	Healthy older adults Mean age 71, 81 women 32 men Well- educated	To study well- being and sociality	UCLA Loneliness Scale Emotional and Social Loneliness Scale	Participants with rewarding social interactions had greater psych well- being and life satisfaction.
Sorkin et. al. 2002 California U.S.	180	Aged 58-90 65% women 90% white	Examine the relationship of loneliness to likelihood of heart condition	UCLA Loneliness Scale	Greater loneliness associated with higher likelihood of coronary disease.
White, et. al. 2002 North Carolina U.S.	39	Mean age of 72 years	Addresses the psychosocial impact of providing internet access	UCLA Loneliness Scale	Those who used the internet trended toward less loneliness and less depression

Author Year Country	N	Sample Description	Pertinent concepts	Loneliness Measure	Findings
Alpass et. al. 2003 New Zealand	217	Aged 65 and over, All men	To understand the relationship of loneliness health and depression in older men	UCLA Loneliness Scale	Lonelier men more likely to be depressed. Social support variables were unrelated to depression
Pinquart 2003 Germany	4130	Older adults	To look specifically at the marriage relationship and loneliness	DeJong- Gierveld and Kamphius Loneliness Scale,	Social contact was more likely to diminish loneliness in unmarried adults. Better functional status related to less loneliness in divorced, widowed, and never-married.
Lauder 2004 Australia	1241	Mean age of 45.1 years.	To identify prevalence and predictors of loneliness	DeJong- Gierveld Loneliness Scale	35% lonely, marriage or cohabitation had a protective effect. Domestic violence was a large predictor of loneliness. Living rurally not predictive.
Yeh et.al. 2004 Taiwan	4895	Older adults	To characterize the relationship of living alone and measures of social support to loneliness	Measured on 3- point self- report likert as strong, some, or little.	Gender, marital status, occupation, source of income, religion, and IADL status were associated with living along.
Yarcheski, et. al 2004 Meta- analysis	37	37 studies included that evaluated positive health practices	To identify predictors of positive health practices	Meta-analysis so studies used multiple methods.	Loneliness was shown to be a strong negative influence on positive health practices

Author Year Country	N	Sample Description	Pertinent concepts	Loneliness Measure	Findings
Rokach 2004 Canada and Portugal	141	36 older Canadians, and 105 older Portuguese	To evaluate the influence of cultural background coping with the experience of loneliness in the older adult	The Loneliness Questionnaire	Coping strategies were diverse and affected by age, life experience, and cultural background.
Dykstra et. al. 2005 Netherland	2925	Born in 1908 to 1937	To evaluate change in loneliness over a 7 year period	DeJong Gierveld Loneliness Scale	Positive association with advancing age and loneliness.
Savikko, et. al. 2005 Finland	6786	75 and over	To examine the prevalence and self-reported causes of loneliness	Self-report of Loneliness as never, sometimes, or always/often lonely.	Prevalence was 39% Most common causes of loneliness were illnesses, death of spouse and lack of friends.
Victor et. al. 2005 Great Britain	999	Over aged 65	What are the vulnerability factors associated with loneliness	Self-Report when asked if never lonely, sometimes lonely, or always lonely.	Six vulnerability factors identified: marital status, increases in loneliness over a decade, increased time alone, increased mental illness, poor health, poorer health than expected.
Rokach 2005 Canada	1347	Aged 13 to 83	Identify the antecedents of loneliness	83 item yes/no questionnaire regarding causes of loneliness	Personal inadequacies accounted for 17% of variance in loneliness, Developmental deficits accounted for 5.5%, Unfulfilling relationships accounted for 5%, Relocation/Separation accounted for 4%.

Author Year Country	N	Sample Description	Pertinent concepts	Loneliness Measure	Findings
Adam et. al. 2006 Illinois U.S.	156	Older adults	Associations with day to day cortisol levels	Self-report by diary of feeling lonely	Prior day feelings of loneliness, sadness, threat or lack of control were associated with higher cortisol levels.
Cacioppo et. al. 2006 U.S.	2193, 212	HRS module data and CHASR data	To evaluate loneliness as predictor for depression	3-item UCLA scale	Loneliness is a predictor for depression
Ekwall et. al 2006 Sweden	4278	Aged 75 and older	To investigate quality of life in relation to loneliness	Three loneliness questions, each with five response alternatives.	Loneliness was the most important factor predicting low quality of life for older people in general.
Paul et. al. 2006 Great Britain	999	65 and older	Evaluate loneliness as a predictor of psychological distress	Self-report of loneliness on likert scale of never, sometimes, often, or always.	Loneliness was the most important predictor of psychological distress in the older adult
Stevens et. al. 2006 Netherland	983	Aged 40 to 85 years	To compare Dutch and U.S. samples for perceived availability of social provisions	DeJong Gierveld Loneliness Scale	High levels of companionship predicted low levels of loneliness for the women. The findings support that the U.S. is a masculine culture with high differentiation among gender roles in the older generations.

Author Year Country	N	Sample Description	Pertinent concepts	Loneliness Measure	Findings
Tomaka et. al. 2006 Texas U.S.	755	New Mexican Seniors	Examined the relationship between social isolation, loneliness, social support and health outcomes	UCLA Loneliness Scale	Loneliness was a consistent predictor for Hispanics of HTN, Stroke, and Heart Disease
Cohen- Mansfield 2007 Maryland U.S.	161	Maryland seniors in low-income housing	Examine predictors of loneliness testing a model	9-item UCLA Loneliness Scale	Social contact, mobility, finances predicted loneliness. Loneliness predicted depression.
Steed et. Al. 2007 Perth, Australia	353	Over 65, community dwelling	To establish prevalence and demographic correlates of loneliness	Self-report using 4 point Likert for how often they felt lonely, 20-item UCLA Loneliness Scale, 11-item DeJong Gierveld Scale	31.5% lonely sometimes, 7% severely lonely. Loneliness associated with worse self-rated health. Social networks protective.
Wilson, et. al. 2007 Illinois U.S.	823	75% women 66% retirement homes	Test the hypothesis that Loneliness is a risk for AD	De Jong Gierveld Loneliness Scale	Higher levels of loneliness over a 4 year period were associated with higher likelihood of developing AD

Table 2

Qualitative Research of Loneliness and the Older Adult

Author, year	Sample	Method of Inquiry	Themes
Rokach 1989 Canada	526 men and women aged 16 to 84 years	Interviewees were asked to write about their loneliest experience. Data was analyzed with a focus on identifying antecedents for loneliness. A multi-cluster model is presented	Antecedents were identified in three categories: 1. Relational deficits 2. Traumatic events Characterological and developmental variables
Letvak 1997 New York U.S.	8 older women in the Adirondacks of New York	Personal Interview	1. Connectedness 2. Need for Control
Wylie et. al. 1999 Great Britain	13	Participants kept diaries and were interviewed about what social factors affected their food choices	Loneliness was identified as a contributing factor to food choices and not wanting to prepare meals.
McInnis, 2001 Canada	20 older women in Canada	Personal Interview	1. Fracture of Relationships 2. Response to pain, darkness and desolation 3. Avoided or dealt with by coping in ways that may or may not work 4. State of anxiety, fear, and sadness, influenced by fear of dependency 5. State of silent suffering.
Barg et. al. 2006 Pennsylvania U.S.	102	Participants were asked to complete CESD scores and also were interviewed to understand the experience of late-life depression	Loneliness plays a role in the experience of depression although it may be a life expectation

Table 3.

Health and Retirement Study Survey Questions Used for Self-Reported Variables

Variable	HRS Questions used for by RAND corporation for RAND Data file
Age	Respondent is asked to give birth date on initial interview. Age is calculated based on birth date for each follow-up interview.
Gender	Respondent is interviewed face to face on initial interview and asked to report gender.
Marital Status	Respondent is asked to report their current marital status. Options include married, married with spouse absent, partnered, separated, divorced, separate/divorced, widowed, or never married.
Living Alone (Number in household)	The respondent is asked to report how many people live in the household including themselves. This is a continuous variable. If the answer is 1, then the respondent lives alone.
Education	"What is the highest grade of school or year of college you completed? Answers are coded in the RAND data file as: 1. Less than high school 2. GED 3. High School Diploma 4. Some college 5. College and up
Poverty	Respondent is asked to report all household income. This reported income level is compared to national poverty standards and this variable reflects whether or not the respondent lives in poverty based on this comparison.
Self-report of Health	Would you say your health is excellent, very good, good, fair, or poor? 1. Excellent 2. Very Good 3. Good 4. Fair 5. Poor

Variable	HRS Questions used for by RAND corporation for RAND Data file
Number of Chronic Diseases (scored as a sum of the yes responses)	HIGH BLOOD PRESSURE Has a doctor ever told you that you have high blood pressure or hypertension? 1. YES 0. NO
	DIABETES Has a doctor ever told you that you have diabetes or high blood sugar? 1. YES 0. NO
	CANCER OF ANY KIND EXCLUDING SKIN Has a doctor ever told you that you have cancer or a malignant tumor, excluding minor skin cancers? 1. YES 0. NO
	LUNG DISEASE Has a doctor ever told you that you have chronic lung disease such as chronic bronchitis or emphysema? 1. YES 0. NO
	HEART CONDITION Has a doctor ever told you that you had a heart attack, coronary heart disease, angina, congestive heart failure, or other heart problems? 1. YES 0. NO
	STROKE Has a doctor ever told you that you had a stroke? 1. YES 0. NO
	EMOTIONAL/PSYCHIATRIC PROBLEMS Have you ever had or has a doctor ever told you that you have any emotional, nervous, or psychiatric problems? 1. YES 0. NO
	ARTHRITIS Have you ever had, or has a doctor ever told you that you have arthritis or Rheumatism? 1. YES 0. NO

Variable	HRS Questions used for by RAND corporation for RAND Data file
Functional Impairment	Respondents are asked if they have difficulty with bathing, dressing eating, getting out of bed or walking. Yes answers are scored as 1 and no answers are scored as 0. The functional impairment score is a sum of the five answers to these questions.
Use of Home Care	Respondent is asked if any medically trained person has come to the respondent's home to help him/her in the previous two years. 1. YES 0. NO
Loneliness Variable	Respondent is told to think about the past week and the feelings they have experienced. They are then asked to tell if the following was true for you much of the time during the past week. You felt lonely. 1. YES 0. NO
Moderate Activity Assessment	Respondent asked how often do you take part in sports or activities that are moderately energetic such as, gardening, cleaning the car, walking at a moderate pace, dancing, floor or stretching exercises? Response options include every day, more than once per week, once per week, one to three times per month, or never.
Tobacco Use	Do you smoke cigarettes now? 1. YES 0. NO
Alcohol Use	In the last three months, on average, how many days per week have you had any alcohol to drink? Answers range from 0 to 7.
Change in Chronic Illness	Respondents are asked the same chronic illness questions for yes or no answers at time two including do you have hypertension, diabetes, cancer, heart disease, lung disease, stroke, psychiatric problems, or arthritis. The interviewer takes a total of new yes responses when compared to the prior survey and this variable reflects the number of new chronic illnesses that the respondent reports. This variable ranges from 0 to 8.
Depression (7-item CESD)	Now think about the past week and the feelings you have experienced. Please tell me if each of the following was true for you much of the time this past week. Did you feel that everything he/she did was an effort, have restless sleep, have trouble getting going, feel lonely, enjoy life, feel sad, and was happy.
Loneliness Time two	Same as loneliness time one. Have you felt lonely much of the past week? Responses coded yes (1) and no (0)

Variable	HRS Questions used for by RAND corporation for RAND Data file
Clinic Visits	For doctor visits, the question asks how many times the respondent has seen or talked to a medical doctor in the past two years or since the last interview, including emergency room or clinic visits.
Nursing Home Stays	The respondent is asked if they were a patient in a nursing home overnight in the past 2 years or since the last interview. Number of total stays is reported in this variable.

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CURRICULUM VITAE

Laurie Theeke, MSN, RNCS, FNP

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Doctoral Candidate

WVU School of Nursing Doctor of Philosophy in Nursing Program

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EDUCATION

Graduate

2002-present	WVU, Doctoral Candidate Doctor of Philosophy in Nursing Program	Morgantown, WV
1989-1992	West Virginia University Masters of Science in Nursing	Morgantown, WV

Undergraduate

1985-1989	West Virginia University Bachelors of Science in Nursing	Morgantown, WV
1983-1985	Allegany Community College Associates Degree in Nursing	Cumberland, MD
1985	Frostburg State College Chemistry	Frostburg, MD
1982	College of William and Mary General Studies	Williamsburg, VA
1981	University of Maine Gifted High School Student Program	Orono, ME

APPOINTMENTS AND POSITIONS

Fall, 2003	Course Coordinator/Lecturer/Clinical Instructor Master's Program/Family Nurse Practitioner Program WVU School of Nursing Morgantown, WV
2003-present	Family Nurse Practitioner/Clinical Specialist in Gerontological Nursing/Clinical Department of Family Medicine

Clark Sleeth Family Medicine Center
Morgantown, WV

- 2002 -2003 Lecturer/Clinical Instructor
BSN Program
Department of Health Promotion and Prevention
WVU School of Nursing, Fall 2002
Responsibilities included teaching Nursing 335 and Nursing 361.
- 1990-2003 Nurse Practitioner/Clinical Specialist in Gerontological Nursing
Department of Internal Medicine and Geriatrics
University Health Associates, Inc.
Morgantown, WV
- 1992-1998 Independent Practice, Employee Health Physicals
Family Nurse Practitioner
Morgantown, WV
- 1990 Clinical Instructor/Post-Anesthesia Recovery Unit
School of Nursing
West Virginia University
Morgantown, WV
- 1988-1990 Clinical Nurse IV
Pediatric Intensive Care Unit
West Virginia University Hospitals, Inc
Morgantown, WV
- Clinical Nurse III
Pediatric Special Care Unit
West Virginia University Hospitals, Inc.
Morgantown, WV
- 1987-1988 Charge Nurse
Morgan Manor Convalescent Center
Morgantown, WV
- Staff Nurse
Frostburg Village Nursing Home
Frostburg, MD

Licenses and Certifications

Clinical Specialist in Gerontological Nursing
 American Nurses Credentialing Center
 Certification #297400-18
 12/1/97-present
 Approved to announce advanced practice as CNS

Family Nurse Practitioner
 American Nurses Credentialing Center
 Certification # 160561-22
 1991-present
 Approved to announce advanced practice as FNP

Prescriptive Privileges
 West Virginia Board of Nursing
 7/1/94-present

DEA Number Approved
 1995-present

Professional Registered Nurse
 Inactive Status

Professional Registered Nurse
 Inactive Status

MEMBERSHIP IN PROFESSIONAL AND SCIENTIFIC SOCIETIES

International Association of Forensic Nurses, 2007-present
 West Virginia Geriatrics Society, 2007-present
 Southern Nursing Research Society, 2002-present
 American Nurses Association, 1989-present
 West Virginia Nurses Association, 1989-present
 West Virginia University Alumni Association, 1999-present
 American Academy of Nurse Practitioners, 1999-present
 State Health Education Council of West Virginia, 1991-1995
 Conference Planning Committee, State Health Education Council of West Virginia, 1992-1995
 National Alliance of Nurse Practitioners, 1990-1996
 Sigma Theta Tau, Nursing Honor Society, 1989-present
 National Alliance of Nurse Practitioners, 1990

RESEARCH, PUBLICATIONS, AND POSTERS

The Relationship of Feeling Lonely to Gender, Self-Report of Health, Number of Physical illnesses, Frequency of Outpatient Visits, and Functional Ability in Older Americans. (poster by Theeke, L.) presented at Translational Research: Bridge or Destination, the 21st Annual Conference sponsored by the Southern Nursing Research Society, Galveston, Texas, February 21, 2007

Gender as a Social Determinant for Loneliness and its Health Outcomes (paper by Theeke, L.) presented at International Nursing Research, the 20th Annual Conference sponsored by the Southern Nursing Research Society, Memphis, Tennessee, February 2, 2006

Theeke, L. Helping Hand: A Story from a Nurse Practitioner at Camp Dawson: Evacuation Site for Hurricane Katrina. *WVU Nursing*. Fall/Winter 2005.

The State of the Science on Perceived Belonging (poster by Theeke, L.), presented at International Nursing Research, the 18th Annual Conference sponsored by the Southern Nursing Research Society, Louisville, KY, February 20, 2004.

Loneliness, the Older Woman, and Health (poster by Theeke, L.), presented at International Nursing Research, the 17th Annual Conference sponsored by the Southern Nursing Research Society, Orlando, FL, February 13, 2003.

“A Descriptive Study of Health Promoting Behaviors and Lifestyle of Appalachian Elderly”, Master’s Thesis. West Virginia University, 1992.

GENESIS (General Ethnographic Nursing Evaluation Studies in the State), (1991, Summer) Participated in the implementation and data collection as a graduate assistant, in Lincoln County, West Virginia

PROFESSIONAL PRESENTATIONS

"Gender as a Social Determinant for Loneliness and its Health Outcomes" (paper by Theeke, L.) presented at Sigma Theta Tau Research Conference, Alpha Rho Chapter, Morgantown, WV. October 14, 2005

“Geriatric Assessment” Morgantown, Senior Center, April 2000

“Problems of the Aged”, Gerontology Graduate Class, February 1996

“Fall Prevention and the Elderly” Drummond Chapter of AARP, Fall 1995

“Preventive Services for the Elderly”, Marion County Senior Center, October 1994

“Home Safety”, Marion County Senior Center, Senior Companions, October 1994

“The Geriatric Team”, Allegany Community College, October 1993

“Fall Prevention and the Elderly”, State Health Education Conference, April 1993

“The Role of the Nurse Practitioner”, WVU School of Nursing, February 1993

“Prevention and Aging”, Avery United Methodist Church, Seniors Group, February 1992

“Functional Assessment of the Elderly”, Grafton Hospital, October 1992

TEACHING

Courses Taught	Term	Enrollment
Nursing 335	Fall 2002, Spring 2003	16
Nursing 361	Spring 2003	13
Nursing 661	Spring 2004	16

SERVICE

WVDHHR, Foster and Adoptive Parent, 2002-present
 Committee Chair, Cub Scout Pack 60, 2003 – 2004
 Committee Member, Boy Scout Troop 65, 2000
 St. John’s University Parish, active member
 Committee Member, Cub Scout Pack 60, 1995-2004
 Committee Chairperson, Cub Scout Pack 60, 1992-1995
 Cub Scout Den leader Assistant, Pack 60, Den 8, 1991-1995
 Morgantown Chamber of Commerce, Subcommittee on Healthcare and Wellness, 1992
 Health Right Clinic Volunteer 1989-1991
 Volunteer, Head Start of Monongalia County, 1989

COMMITTEE MEMBERSHIPS

Planning Committee Member, Self-Care for Nurses: 7th Path Self-Hypnosis Workshop,
 Approved by New York State Nurses Association, *Cooper Hypnosis*, Summer 2007.
 West Virginia University, Social Justice Committee, 2003