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The purposes of this study were to explore the expectations of older adults with medically diagnosed osteoarthritis (OA) who are scheduled for total knee replacement (TKR) surgery and to examine factors that influence the older adult's quality of life prior to TKR surgery. The revised Wilson and Cleary model of health-related quality of life was used to guide the study. Characteristics of the individual (age, race, sex, expectations), characteristic of the environment (social support), biological factors (body mass index), symptoms (pain, fatigue, depression), functional status, and general health perception were examined to determine their influence on overall quality of life.

A cross-sectional, correlational non-experimental study was conducted with a convenience sample of 75 older adults who were planning first time TKR surgery for OA of the knee. Participants were mostly female (76%), White (67%), married (73%), and approximately one-third reported an annual household income greater than \$71,000. The ages of the sample ranged from 52 to 86 years, with a mean age of 69 years ($SD = 8.179$).

When all 11 variables were included in the model, 62% of the variability in overall quality of life was explained. However, only the variables of depression, functional status, general health perception, and social support significantly ($p \leq 0.05$) contributed to quality of life. Individuals in this study reported high expectations for the outcomes of the TKR surgery, such as improved symptoms and physical function as well as high overall quality of life. Future studies should continue to explore the indirect influence of expectations and the relationships among the factors that influence the older

adult's quality of life prior to TKR surgery to develop interventions to enhance their quality of life.

FACTORS INFLUENCING QUALITY OF LIFE IN
OLDER ADULTS WITH OSTEOARTHRITIS
PRIOR TO TOTAL KNEE
REPLACEMENT

by

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Approved by

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To Scott, Emma, and Trevor for their never ending love and support.

I love you all so much!

APPROVAL PAGE

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CHAPTER I
BACKGROUND

Introduction

In 2006, people ages 65 and older accounted for 12% (37 million) of the United States (U.S.) population (Federal Interagency Forum, n.d.). It is estimated that the older adult population of the U.S. will double in size from 35 million in the year 2000 to 71.5 million in 2030 and will account for 20% of the population (Federal Interagency Forum). This dramatic increase in the older population group is due to the aging *Baby Boomers* or individuals born between 1946 and 1964 (U.S. Census Bureau, 2001). These changing demographics coupled with the limited financial resources and the emphasis to document positive outcomes of nursing and medical interventions have created challenges for health care researchers, clinicians, and policy makers. Health outcomes of particular interest to nursing and other health sciences include symptoms, functional status, general health status, emotional status, and overall quality of life (Anderson & Burckhardt, 1999). Therefore, research of health outcomes with older adults is essential to guide health care in the future.

Increased demands by agencies to demonstrate positive patient outcomes has also resulted in a change in approach from the traditional reductionist medical model of care to a more holistic, subjective approach focused on the individual's quality of life. Health

care continues to undergo a fundamental paradigm shift related to approaches to health and quality of life with an awareness that extended quantity of life is not equal to an extended quality of life (Farquhar, 1995). Acknowledgement of the importance of social consequences of disease and the advancement of medical interventions aimed to increase the quantity and quality of life has been the driving force for consumers and providers in conceptualizing health and evaluating health care (Carr, Gibson, & Robinson, 2001). Thus, outcomes, such as effectiveness and efficiency of health care, are often assessed based on its impact on an individual's perceived quality of life (Carr et al., 2001).

In the past, health outcome measurements were limited to morbidity and mortality. Yet, these measures are not sensitive to specific interventional strategies and treatments (Sousa, 1999). People are living longer and have higher expectations for a *good life*. These higher expectations, changing demographics, and the potential for increased incidence of chronic diseases (Elders, 2000; Helmick et al., 2008; Lawrence et al., 2008) are the driving forces for the increasing awareness of quality of life in older adults. With the rise in public expectations, health is no longer viewed in terms of survival, but rather the emphasis is now on well-being and quality of life (McDowell, Hughes, & Borrud, 2006). Clinicians, researchers and policymakers are interested in ways to better measure and enhance the quality of life of older adults as a potential for improving health care and reducing public expenditures (Brown, Bowling, & Flynn, 2004). The challenges are determining what constitutes a *good life* or quality of life in old age. Health care will benefit from a better understanding of the linkages and relationships among the various dimensions of quality of life. This knowledge will assist

nurses and other healthcare professionals to design effective interventions to enhance quality of life for older adults with chronic diseases.

Arthritis is one of the most common chronic diseases in older adults and is the leading cause of functional disabilities among those over the age of 65 (Centers for Disease Control and Prevention [CDC], 2009). Among all racial and ethnic groups, one in five adults (46.4 million) in the U.S. has medically diagnosed arthritis (U.S. Department of Health and Human Services [DHHS], 2008; Helmick et al., 2008), and this number is expected to grow to 67 million by 2030 (U.S. DHHS, 2008). Additionally, one in three (70 million) have arthritis symptoms (Felson, Lawrence, Dieppe, Hirsch, & Helmick, 2000). According to the CDC (U.S. DHHS), arthritis accounts for \$81 billion in medical cost (in 2003 dollars) and is the reason for 750,000 hospitalizations and 36 million visits to health care providers each year.

Arthritis has more than 100 variations and is the most common cause of pain in older adults (American Academy of Orthopedic Surgeons, 2009). While arthritis seldom results in death, this common medical condition may substantially affect an individual's physical and psychological well-being and ultimately, their overall quality of life (Farquhar, 1995). Because arthritis progresses with age and the U.S. population continues to age, the prevalence of this disease is projected to increase in all racial and ethnic groups (Ethgen, Bruyere, Richey, Dardennes, & Reginster, 2004; Gignac et al., 2006; Luggen, 2001); thus, validating the continued public health burden of arthritis and the need for ongoing assessments of quality of life as an essential element in health care outcomes evaluation in those with arthritis (Coons, Rao, Keininger, & Hays, 2000).

Background and Significance

Osteoarthritis (OA), the most common form of arthritis, accounts for 55% of all arthritis-related hospitalizations (U.S. DHHS, 2008; McIlvane, 2007). Osteoarthritis of the knee is the most significant source of pain and physical disability in older adults and is one of the five leading causes of disability among older adults (U.S. DHHS). Currently in the U.S., 37.2 million White, 4.6 million Black, and 3.1 million Hispanic adults are living with OA (Lawrence, et al., 2008; U.S. DHHS). Within the older adult population, OA affects 33.6% or 12.4 million of all racial groups (U.S. DHHS). As the prevalence of OA increases with age, limitations to physical function also tend to increase (Appelt, Burant, Siminoff, Kwoh, & Ibrahim, 2007; Quintana et al., 2008). In fact, 80% of individuals with OA have some degree of physical function limitation, while 25% cannot perform activities of daily living such as walking up stairs, bending, dressing, or bathing (Institute of Arthritis, n.d.; U.S. DHHS). The consequences of OA may be detrimental to the older adult resulting in not only changes in physical function but also increased symptoms of pain, fatigue, and depression and a decreased quality of life (Birchfield, 2001).

To achieve a better understanding of quality of life in older adults, it is important for research to move beyond health and functional status. Gabriel and Bowling (2004) contend that quality of life research, especially in older adults, should focus on the personal characteristics and circumstances as influential variables as well as the individual's dynamic interactions with society. In an European study, Bowling and

colleagues (2002) sought to define the indicators of quality of life in older adults to attempt the development of a multidimensional model of quality of life based on the older adults' perceptions. The researchers focused on the extent to which global quality of life was influenced by health, psychological and social variables, and social circumstances. They found that social relationships and good health were among the top criterion of quality of life in adults aged 65 and older (Bowling, Banister, Sutton, Evans, & Windsor, 2002). Consequently, multiple factors influence quality of life in older adults.

Quality of life is best studied from the perspective of the individual and not how society would define quality of life. For example, in a study of patients with moderate to severe disabilities (N=153), over half reported their quality of life as good or excellent despite their disabilities (Albrecht & Devlieger, 1999). This *disability paradox* highlights the importance of individual perception of disability in defining one's world view and quality of life (Albrecht & Devlieger). In the previous example, if the individuals would have been assessed for their quality of life solely based on their functional abilities, the quality of life interpretations may have been misrepresented.

Numerous studies evaluating quality of life among older adults with OA (Dominick, Ahern, Gold, & Heller, 2004b; Jakobsson & Hallberg, 2006; Groessl, Kaplan, & Cronan, 2003) have reported that pain and functional limitations are the common factors associated with decreased quality of life. Many older adults with OA of the knee elect to have surgical interventions, such as total knee replacement (TKR) surgery, expecting pain relief, and improved physical function and quality of life postoperatively (Hirvonen et al., 2006). Mancuso and colleagues (2001) also noted that individuals have

multiple expectations of TKR surgery related to symptom relief and improved physical and psychosocial function. According to the report, these expectations varied by individual characteristics, such as age and sex. For example, older adults were more likely to expect pain relief ($p = 0.04$) and improved ability to walk ($p < 0.001$) than younger adults. Also, of the entire sample ($N = 377$), more women (57%) than men (29%) expected improvements in ability to walk ($p = 0.001$) (Mancuso et al.). The challenge for health care providers is properly identifying these expectations through improved communication and assessment.

Examining expectations is important because research has demonstrated a positive correlation between fulfilled pre-operative expectations and satisfaction with outcomes among adult patients (Iversen, Daltroy, Fossel, & Katz, 1998; Lutz et al., 1999; Mancuso et al., 2001). This relationship was supported in an orthopedic population by Mahomed and colleagues (2002) who found that individual expectations were important predictors of satisfaction and functional outcomes following total joint replacement surgery. Several studies have also examined the influence of pre-operative expectations on other post-operative outcomes such as symptom reduction, improved physical function, and overall satisfaction following joint replacement surgery (Engel, Hamilton, Potter, & Zautra, 2004; Lingard, Sledge, & Learmonth, 2006; Mancuso et al.). Effective communication between the provider and the older adult patient prior to surgery may reveal unrealistic expectations and allow the provider an opportunity to offer education related to more realistic expectations.

Unfortunately, few studies have examined the influence of older adult's expectations on quality of life (Saban & Penckofer, 2007; Staniszewska, 1999). Saban and Penckofer found that among adults who had undergone lumbar spinal surgery, preoperative expectations were a significant predictor of postoperative quality of life. Additionally, Staniszewska qualitatively found that adult cardiac patients (N=33) have broader expectations for quality of life than is captured on the commonly used generic instruments. However, no studies were found that specifically examined the influence of individual expectations on quality of life among older adults with OA prior to TKR surgery. Because of the increasing prevalence of OA and the aging population, focusing research on patient reported outcomes such as quality of life and expectations is imperative.

Individuals, including older adults, compare their expectations with their experiences as a method of assessing their quality of life (Carr et al., 2001). For example, if the older adult has high expectations for decreased pain along with improved physical function and quality of life following TKR surgery and the actual experience was positive, the individual's perceived quality of life may be high due to fulfilled expectations. However, if the older adult has high expectations for decreased pain and improved physical function and quality of life following TRK surgery, but the actual experiences were negative, meaning their levels of pain and physical function were not improved to their expectations, their perceived quality of life may remain unchanged or even decrease post-surgery as a result of unmet expectations. Understanding expectations, as well as other factors that influence quality of life, is important because

unmet expectations may result in dissatisfaction and non-adherence to the treatment plan following surgery (Mancuso, Sculco, & Salvati, 2003; Mancuso et al., 2001). Conversely, realistic expectations which are fulfilled may result in higher overall satisfaction, positive attitudes regarding the rehabilitation plan, and improved post-operative outcomes.

Linder-Pelz (1982) defined patient satisfaction as “the individual’s positive attitude toward, i.e., positive evaluation of, the health care (s)he experienced” (p. 583). According to Ferrans and Powers (1992) quality of life is usually associated with satisfaction or happiness. Conversely, Hawker et al. (1998) considered satisfaction to be a factor of quality of life. If expectations are important predictors of satisfaction with care (Mahomed et al., 2002), and satisfaction is considered to be a factor of quality of life (Hawker et al., 1998), then individual expectations will influence not only quality of life but also the determinants of quality of life.

Enhancing quality of life in older adults with physical limitations is one of the most significant challenges currently facing healthcare providers (Levasseur, Desrosiers, & Tribble, 2008). The first step to improving quality of life in older adults with OA is to better understand the factors, such as expectations, that influence quality of life. Despite the continued debate regarding the dimensions of quality of life, there are three general areas of agreement: (a) quality of life is subjective (Leventhal & Colman, 1997; Netuveli & Blane, 2008), (b) quality of life is multidimensional (Hagberg, Hagberg, & Saveman, 2002; Rejeski & Shumaker, 1994; Taillefer, Dupuis, Roberage, & Le May, 2003), and (c) a strong conceptual model is necessary for quality of life research (Sousa, Holzemer,

Henry, & Slaughter, 1999). Unfortunately, literature related to quality of life and older adults with OA consistently lacks the application of a conceptual model.

The use of a theoretical model in quality of life research has great utility by providing a frame of reference for variable selection and aiding in improving conceptual clarity (Sousa, 1999). A model that fosters a more holistic approach should include not only physical factors, but also emotional and psychological factors that contribute to an individual's judgments of their perceived quality of life (Carr et al., 2001; Netuveli & Blane, 2008). For older adults with OA, this approach will provide a foundation for interventions prior to surgery to aid in setting realistic expectations and goals for the recovery period. Comprehensively examining the multiple dimensions of quality of life and the influence of expectations and other factors on quality of life in older adults with OA who are scheduled to undergo TKR surgery will provide rich information for targeted educational and counseling interventions and may be an essential tool in managing the increasing impact of OA in this population.

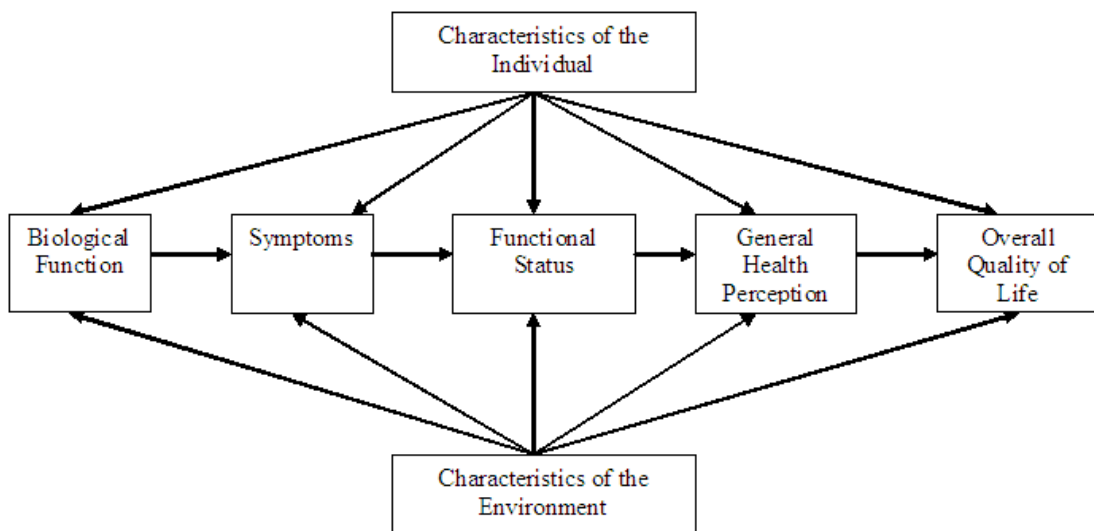
Purpose

The purposes of this study were to explore the expectations of older adults with medically diagnosed OA who are scheduled for TKR surgery and to examine factors that influence the older adult's quality of life prior to TKR surgery.

Conceptual Framework

The revised Wilson and Cleary's (1995) model of health-related quality of life (Ferrans, Zerwic, Wilbur, & Larson, 2005) was used to guide this study (see Figure 1).

Figure 1. Revised Wilson and Cleary Model of Health-Related Quality of Life



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According to the original model (Wilson & Cleary), there are four main factors of overall quality of life: (a) biological function, (b) symptoms, (c) functional status, and (d) general health perception. This revised model purports that characteristics of the individual and environment not only influence each of the four factors of quality of life, but also quality of life itself. Therefore, quality of life is not only influenced by factors such as chronic disease, symptoms, and functional status but also by characteristics of the

individual and environment, such as expectations and social support, respectively. This holistic model provided theoretical strength to quality of life research in older adults with OA by clarifying critical factors and their relationships (Ferrans et al., 2005).

According to Ferrans and colleagues (2005), characteristics of the individual are categorized as factors that influence health outcomes. These include demographic, biological, psychological, and developmental factors. Demographic factors such as sex and age have been linked to the prevalence of OA in adults (O'Connor, 2006). Psychological factors are modifiable, dynamic responses to interventions and include cognitive appraisal, affective response, and motivation (Ferrans et al., 2005). Included in the cognitive appraisal are an individual's attitudes, beliefs and knowledge toward the illness, treatment or actions. Although not specifically included by Wilson and Cleary (1995) or Ferrans et al. (2005), individual expectations should be included as a cognitive appraisal. Researchers contend that individuals have internal standards, such as expectation levels, aspirations, personal needs, and personal values, by which judgments or appraisals are made regarding experiences (Campbell, Converse, & Rodgers, 1976) and quality of life (Wilson & Cleary, 1995). Thus, expectations are a result of a cognitive appraisal process (Staniszewska, 1999; Thompson & Sunol, 1995; Uhlmann, Inui, & Carter, 1984) with anticipation and beliefs as the defining attributes.

Environmental characteristics are either social or physical (Ferrans et al., 2005). Social characteristics include the influence of friends and family as well as the individual's role within the social setting (Ferrans et al., 2005). Older adults may receive information from family or friends that influence their expectations of TKR surgery.

Physical factors of the environment may contribute to the racial disparities in the decision to have TKR surgery. For example, certain neighborhoods may be physically located in closer proximity to hospitals with lower case volumes of TKR surgeries. Research has demonstrated that hospitals with lower case volumes have higher complication rates and poorer outcomes related to symptoms and functional status following TKR surgery (Hervey et al., 2003; Losina et al., 2007), which may result in worsening symptoms and ultimately a decrease in quality of life for the older adult. Thus, physical factors, such as neighborhood location and access to health care services, may influence health outcomes through the individual's health care decisions, expectations, and ultimately influence overall quality of life.

Biological function includes whole organ-level processes that support life (Ferrans et al., 2005). Further, alterations in biological function may directly or indirectly affect the other factors of quality of life such as symptoms, functional status, and general health perceptions. For example, an individual's body mass index may increase their risk of developing OA (Felson et al., 2000; Messier, 1994; Murphy, Smith, Clauw, & Alexander, 2008; Zhang & Jordan, 2008).

As noted in Figure 1, biological function leads to symptoms. According to Wilson and Cleary (1995), a symptom may encompass the individual's perception of any abnormal physical, emotional, or psychological conditions. Chronic conditions, such as OA, generally result in symptoms such as pain. If not properly managed, pain may lead to depression and fatigue in some individuals. Symptoms are individualized and may differ depending where the individual is along the disease trajectory. According to Ferrans et al.

(2005), it is crucial to understand the relationship of physical and emotional symptoms to better understand the older adults' quality of life. Understanding how an individual experiences, evaluates and interprets their symptoms, the relationship between those symptoms, and how those relationships are influenced by characteristics of the individual and environment is essential in better understanding quality of life in older adults.

The next factor in this model is functional status which is the individual's ability to perform tasks in several domains such as physical, social, role, and psychological functioning (Wilson & Cleary, 1995). Leidy (1994) refers to functional status as the entire domain of functioning: functional capacity, functional performance, functional reserve, and functional capacity utilization. This multidimensional concept characterizes the individual's ability to perform the activities of daily living, fulfill usual roles, and maintain health and well-being (Bennett, Stewart, Kayser-Jones, Glaser, 2002; Leidy). An individual's functional status may be influenced not only by the characteristics of the individual and environment, but also biological function and symptoms and therefore, may ultimately influence quality of life.

General health perception is the individual's overall evaluation of the various aspects of his or her health (Wilson & Cleary, 1995). General health perceptions are influenced by all of the other factors in the model and are highly subjective. According to Ferrans et al. (2005), general health perception can be assessed in one global rating of their health and may be influenced directly by the characteristics of the individual and environment or indirectly through the preceding factors.

Overall quality of life was the final and global outcome of the model. Wilson and Cleary (1995) identified the concept as a subjective assessment of how satisfied the individual is with his or her life overall. Quality of life is an individual's subjective judgment based on the assessment of the gap between an individual's expectations and their actual experience (Calman, 1984; Leventhal and Colman, 1997). In the traditional medical model, quality of life is viewed in terms of illness and health related variables (Calman), whereas nursing tends to take a more global, holistic approach to quality of life (Farquhar, 1995; Ferrans & Powers 1992;). Quality of life reflects the personal characteristics and concerns of the individual along with the influences of the external environment (Gabriel & Bowling, 2004). Despite the potential influence of societal values and norms, quality of life is based on the unique perceptions of the individual and may or may not correspond with the evaluation of others. The term quality of life goes beyond the impact of treatments and recognizes the individual as a whole person, encompassing body, mind and spirit (Calman).

The revised Wilson and Cleary model (Ferrans et al., 2005) provided a guide for empirically understanding the relationships between factors such as characteristics of the individual and environment, biological function, symptoms, functional status, general health perception and quality of life (Sousa, 1999). Examining individual expectations in combination with quality of life assessment may potentially provide nurses with a more comprehensive evaluative picture from the older adult's perspective (Staniszewska, 1999). Assisting older adults in effectively responding to the physical, psychological, and social challenges of aging may ultimately add quality to years of life (Brown et al., 2004).

Nurses must understand the factors that contribute to quality of life in older adults with OA to appropriately design, implement and assess the effectiveness of interventions and the associated health outcomes.

Specific Aims

The specific aims and associated research questions for this study were:

1. Describe the expectations of older adults with medically diagnosed OA who are scheduled for TKR surgery.

Question (Q) 1. What are the expectations of older adults with medically diagnosed OA who are scheduled for TKR surgery?

Q2. Do characteristics of the individual (age, sex, and race) significantly explain the variance in expectations of the older adults with medically diagnosed OA who are scheduled for TKR surgery?

2. Examine the influence of expectations of older adults with medically diagnosed OA who are scheduled for TKR surgery on quality of life.

Q3. Do expectations significantly explain the variance in quality of life for older adults with medically diagnosed OA who are scheduled for TKR surgery?

Q4. When controlling for expectations, do biological function (BMI), symptoms (pain, fatigue, depression), functional status, general health perception, characteristics of the individual (age, sex, and race), and

characteristic of the environment (social support) significantly explain the variance in quality of life for older adults with medically diagnosed OA who are scheduled for TKR surgery?

3. Examine the influence of the factors on quality of life in older adults with medically diagnosed OA who are scheduled for TKR surgery.

Q5. Do biological function (BMI), symptoms (pain, fatigue, and depression), functional status, general health perception, characteristics of the individual (age, sex, race, and expectations), and characteristic of the environment (social support) significantly explain the variance in quality of life for older adults with medically diagnosed OA who are scheduled for TKR surgery?

Q6. When controlling for characteristics of the individual (age, sex, race, and expectations), do biological function (BMI), symptoms (pain, fatigue, and depression), functional status, general health perception, and characteristic of the environment (social support) significantly explain the variance in quality of life for older adults with medically diagnosed OA who are scheduled for TKR surgery?

Q7. When controlling for characteristic of the environment (social support), do biological function (BMI), symptoms (pain, fatigue, and depression), functional status, general health perception, characteristics of the individual (age, sex, race, and expectations) significantly explain the variance in quality of life for older adults with medically diagnosed OA who are scheduled for TKR surgery?

Q8. When controlling for characteristics of the individual (age, sex, race, and expectations) and characteristic of the environment (social support), do biological function (BMI), symptoms (pain, fatigue, and depression), functional status, and general health perception significantly explain the variance in quality of life for older adults with medically diagnosed OA who are scheduled for TKR surgery?

Operational Definitions

1. Osteoarthritis is

characterized by progressive damage to the joint cartilage that causes changes in the structure around the joint. These changes can include fluid accumulation, bony overgrowth, and loosening and weakness of muscles and tendons, all of which may limit movement and cause pain and swelling (American College of Rheumatology, 2006, ¶ 2).

For this study, OA was operationalized as all persons with a diagnosis of OA who are scheduled for their first time TKR surgery.

2. Expectations: Expectations refers to the individual's anticipation of or look forward to the coming occurrences. In this study, expectations were operationalized as the score on the Hospital for Special Surgery Knee Replacement Expectations Survey (Mancuso et al., 2001).

3. Quality of Life: An individual's well-being in relation to how satisfied they are with life as a whole (Ferrans et al., 2005). For this study, quality of life was

- operationalized as a score on the Ferrans and Powers Quality of Life Index-Arthritis Version-III (Ferrans & Powers, n.d. & 1985).
4. Characteristics of Individual: Demographic, developmental, psychological, and biological factors that impact health outcomes (Ferrans et al., 2005). For this study, the demographics of the individual included age, race, sex, marital status, and socioeconomic status, as reported to the Principal Investigator (PI) and recorded on the PI developed Demographic Information Form.
 5. Characteristic of the Environment: Social factors present in an individual's life that influence health. For this study characteristic of the environment was operationalized as a score on the Medical Outcomes Study- Social Support Scale (Sherbourne & Stewart, 1991).
 6. Biological function: The whole organ level process that supports life (Ferrans et al., 2005). Biological function was operationalized by a calculation of body mass index calculated from a measurement of height and weight obtained during the interview and recorded on the Demographic Information Form.
 7. Symptom: "A patient's perception of an abnormal physical, emotional, or cognitive state" (Ferrans et al., 2005, p. 339). Pain is defined by the International Association for the Study of Pain (IASP) (2007a & 2007b) as "an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage" (§ 18). Symptom of pain was operationalized as a rating on the Demographic Information Form in a single numeric rating scale from zero (no pain) to ten (extreme pain). Fatigue was operationalized as a rating on the

- Demographic Information Form in a single numeric rating scale from zero (no fatigue) to ten (extreme fatigue). Depression was operationalized by the self-reported score on the Geriatric Depression Scale Short Form (15-item).
8. **Functional Status:** The ability to perform task of physical function such as actual mobility and social function. For this study, functional status was operationalized as a score on the Western Ontario and McMaster Universities Osteoarthritis Index function subscale.
 9. **General Health Perception:** An overall evaluation of health that is subjective and integrates biological function, symptom, and functional status. In this study, general health perception was measured by a single question on the Demographic Information Form, “How would you rate your current health on a scale from 1 (poor) to 10 (excellent)?” (Ferrans et al., 2005).

Assumptions

There are several assumptions underlying this study. It was assumed that unobservable concepts such as individual’s expectations, symptoms, and quality of life could be quantified and measured by the identified instruments. It was also assumed that the older adults’ have expectations for TKR surgery. Finally, it was assumed that the individuals would provide truthful and accurate answers to the questions measuring the concepts of interest in this study.

Summary

The purposes of this study were to explore the expectations of older adults with medically diagnosed OA who are scheduled for TKR surgery and to examine factors that influence the older adult's quality of life prior to TKR surgery. The revised Wilson and Cleary model of health-related quality of life (Ferrans et al., 2005) was used to guide this research. This study adds to the nursing knowledge and provides guidance for improving patient care. The results will help pave the way to further research that will aid in determining the relationship of specific factors that influence quality of life across a wide range of diagnoses; thus, enabling nurses to better understand and develop interventional strategies targeting influencing factors. This study also provides the base-line measures for a follow up longitudinal study to examine the relationship between the pre-operative expectations and the fulfilled expectations following surgery.

CHAPTER II

LITERATURE REVIEW

Introduction

The discussion of quality of life dates back to the ancient philosophers, such as Aristotle, who struggled with understanding the concept of well-being and what constitutes a good life. The term quality of life entered into the American dialogue as early as the 1930's and was initially used in reference to material items such as houses and cars (Campbell, Converse, & Rodgers, 1976). In the post World War II era, United States (U.S.) politicians began using the term to emphasize that having a good life goes beyond the value of materialistic possessions (Campbell et al., 1976; Register & Herman, 2006). The American people were encouraged to concentrate on a sense of well-being and not being well off (Campbell et al.), thus shifting the focus to experiences of life, whether positive or negative, and not the conditions of life.

In more recent years, the concept of quality of life has attracted the attention of many social researchers and health care providers, and the concept has broadened. Traditionally, researchers of economics, medicine, and the social sciences have been interested in the concept of quality of life as a measure of the social effects of policies and practice. However, the approach of each of these disciplines has varied in their conceptualization and measurement of quality of life (Cummins, 2005). Sociologists and

psychologists described quality of life in terms of the individual's expectations and aspirations and how well those expectations are fulfilled (Anderson & Burckhardt, 1999). During the mid 1970s, health care researchers and clinicians in disciplines such as oncology, rheumatology, and psychiatry began to focus on quality of life as a method of documenting positive outcomes of nursing and medical interventions, especially in chronic diseases (Farquhar, 1995; Smith, Avis & Assmann, 1999). As a result, quality of life is viewed in terms of illness and health related variables in the traditional medical model (Calman, 1984), whereas nursing tends to take a more global, holistic approach to the concept (Farquhar; Ferrans & Powers 1992). Although quality of life is viewed by most health care providers as a desired patient outcome essential to human health (Register & Herman, 2006), this multidimensional concept lacks a widely accepted, clear definition (Taillefer et al., 2003). This conceptual ambiguity has made it difficult to synthesize and compare quality of life studies in the literature.

Theoretical Perspective of Quality of Life

There is an enormous amount of literature focused on quality of life and on a wide range of objective (macro; societal) and subjective (micro; individual) factors or domains of quality of life (Brown et al., 2004; Romney & Evans, 1996). Traditionally, objective domains of quality of life have referred to things such as income, housing, employment, education, environment; whereas, subjective domains have referred to the individual's experiences, values, and overall perception of quality of life and related indicators such

as well-being. Cavanaugh and Blanchard-Fields (2006) proposed that quality of life is usually divided into four domains of well-being: environment, physical, social, and psychological. Understanding the personal evaluation of each of these domains is essential in understanding how individuals view their situations and assess their quality of life.

Much of the quality of life debate remains over what domains influence quality of life. According to the World Health Organization (WHOQOL Group, 1995), quality of life is defined as “individuals’ perception of their position in life in the context of the culture and value systems in which they live and in the relation to their goals, expectations, standards and concerns” (p.1405) and should include physical, psychological, and social as the minimum dimensions. Quality of life is a broad concept which incorporates the individual’s physical health, level of independence, psychological state, social relationships, personal beliefs, and relationships with the environment in which they live (WHOQOL Group). Some researchers also believe that psychological factors such as optimism and positive attitudes enhance quality of life (Garbriel & Bowling, 2004), thus, demonstrating the ongoing debate of what actually constitutes quality of life.

For over three decades there has been an explosion of research addressing quality of life among the disciplines of nursing and medicine. Individual ontological perspectives have shaped the epistemological and methodological approaches to quality of life (Register & Herman, 2006). Quality of life has been used to mean a variety of things such as happiness, life satisfaction, health status, improved physical functioning, and

decreased symptoms (Cavanaugh & Blanchard-Fields, 2006; Ferrans et al., 2005; Oleson, 1990) with happiness and satisfaction being the most commonly used terms (Ferrans & Powers, 1992; Netuveli & Blane, 2008). Using these terms synonymously with quality of life along with the heterogeneous manner of reports have further contributed to the conceptual confusion and makes synthesis and comparisons of the findings difficult (Farquhar, 1995).

Traditionally, two theoretical perspectives are presented in the literature regarding quality of life: global quality of life and health-related quality of life (Register & Herman, 2006). From a global perspective, quality of life is viewed as multi-dimensional and holistic and includes all aspects of the individual's life. Conversely, health-related quality of life is a more limited perspective that views quality of life only in respect to the impact of health, illness, and/or treatment. This approach excludes other attributes of quality of life such as cultural, social, and political (Ferrans et al., 2005; Register & Herman). For researchers, the dilemma occurs because of the lack of conceptual distinction between quality of life and health-related quality of life, and many ask if these terms co-exist or interrelate so powerfully that they cannot be separated. However, there is consensus that quality of life is a multidimensional, subjective and cognitive process (Oleson, 1990, Smith et al., 1999) influenced by personal and environmental factors (Ferrans et al., 2005).

Researchers have sought to clarify the concept of quality of life such as the early social science researchers who sought to better understand the basic components of quality of life or life satisfaction. Among these researchers were Campbell et al. (1976)

who explored life satisfaction in a general population sample and proposed that the quality of life domains are influenced by individual characteristics and that satisfaction with quality of life is tied to expectations and the standards of comparison. George and Bearon (1980) identified four underlying dimensions for quality of life: life satisfaction, self-esteem, general health and functional status, and socioeconomic status. Later, work by Lawton (1991) identified the dimensions of quality of life as including four large evaluative sectors: behavioral competence, perceived quality of life, environment and psychological well-being.

Despite these early attempts to clarify the concept, the collection of investigations examining quality of life lacked consensus regarding the definition and the relevant domains of the concept of interest. However, certain aspects of quality of life have been consistently identified: (a) quality of life can only be understood from the perspective of the individual; thus, quality of life is a subjective phenomena; (b) quality of life is influenced by numerous domains or dimensions of life; and (c) the difference between an individual's expectations in each domain and what actually occurs determines satisfaction or happiness with life (Anderson & Burckhardt, 1999). The later aspect concurs with Calman (1984) who stated "a good quality of life can be said to be present when the hopes of an individual are matched and fulfilled by experience" (p.124-125). Nearly two decades later, Carr and colleagues (2001) stated that "people assess their health-related quality of life by comparing their expectations with their experiences" (p. 1240). Therefore, there is a consensus that quality of life is individually assessed based on the gap between expectations and actual experiences.

It is important to move beyond health and functional status to achieve a better understanding of quality of life in older adults. The traditional ideas of health and quality of life have more often reflected the dominate values of our society. An alternative to the traditional theoretical views of quality of life among older adults is that quality of life is a cumulative process. This development of quality of life perspectives results from a series of connections and disconnections experienced on a daily basis which enhance or diminish quality of life. According to Register and Herman (2006), connectedness refers to “a state of synchronous, harmonious, and interactive presence” (p. 343). The register theory of generative quality of life for the elderly is a theoretical model in which quality of life in older adults is placed in a context of connectedness (Register & Herman). The authors contend that older adults generate quality of life through experiences of connectedness with six processes: (a) metaphysically (self-awareness), (b) spiritually, (c) biologically (developing adaptive behaviors to counterbalance limitations), (d) connected to others (socially), (e) connected to their environment (adapt as needed to foster independence), and (f) connected to the general society (Register & Herman). This framework may be useful in explaining how older adults gain or generate quality of life.

Theoretically, most researchers tend to support that quality of life is unique to each individual and that the perceived level of quality of life may decline when challenges occur such as chronic disease (Anderson & Burckhardt, 1999; Carr & Higginson, 2001; Ferrans et al., 2005; Register & Herman, 2006). In many cases, such as older adults with chronic diseases, health affects all areas of the individual’s life and is difficult to separate the cultural, political, and social influences on quality of life. For

example, among older adults with osteoarthritis (OA), studies have demonstrated ethical differences among the utilization of total knee replacement (TKR) surgery between older Black and White adults (Figaro, Russo, & Allegrante, 2004; Suarez-Almazor et al., 2005). Blacks tend to have very different expectations of the TKR surgery compared to Whites. These expectations may be constructed based on the influences of culture and society such as the media, friends and family (Ibrahim, Siminoff, Burant, & Kwok, 2002; Suarez-Almazor et al.). More importantly, these expectations influence decisions to delay or decline interventions, such as surgery, to alleviate symptoms and therefore, improve physical function that may ultimately influence quality of life. Thus, trying to separate the aspects of life that health does not influence or, conversely the aspects of life that do not influence health is very difficult and in some situations, virtually impossible to achieve.

There is increasing evidence to support that patients with chronic diseases may change their standards or conceptualization on which they make the subjective judgments regarding their quality of life (Sprangers & Schwartz, 1999). In fact, individuals may accommodate to their illness, a process known as response shift (Sprangers & Schwartz). For example, older adults with chronic knee pain may adapt their daily routines or reduce the number of activities to cope with the symptoms, such as fatigue. Therefore, it is important to also consider that quality of life is a changing or dynamic construct. However, when measuring quality of life by aggregating all items on the instrument into overall scores or scales, the assumption is that quality of life is stable, not dynamic (Bernhard, Lowy, Mathys, Herrmann, & Hurny, 2004). In older adults, priorities and

expectations may change over time in response to life circumstances such as chronic illness. Each person has their own perspective of the factors of quality of life and many of the commonly used measures do not assess what is important to the older adult in determining their quality of life. Understanding the value the older adult assigns to the factors of quality of life is imperative.

Approaches to quality of life measurements have assumed that individual's perceive the same condition in the same way (Browne et al., 1994). For example, among older adults with OA, individuals may perceive their quality of life very differently despite similar pain ratings and limitations in physical function. More importantly, the presence of a chronic disease does not equate to poor quality of life for the older adult.

Quality of Life and Health Status

Quality of life, health-related quality of life, health status, and functional status have all been used interchangeably to refer to the domain of health (Greenfield & Nelson, 1992; Guyatt, Feeny, & Patrick, 1993; Kaplan, 2003). Thus, there remains a debate on how quality of life differs from health status. With the rise in public expectations for positive health outcomes and improved quality of life, health care has undergone a fundamental paradigm shift in that health is no longer viewed in terms of survival, but rather the emphasis is now on well-being and quality of life (McDowell et al., 2006).

The biomedical model defines health as the absence of disease. However, the World Health Organization (1948) contends that health is more than just absence of

disease but rather is a state of complete mental, physical and social well-being. The later definition of health aligns more closely with that of nursing which tends to take a more holistic approach to include the individual's perspective of their experience of illness and quality of life. With the expanded definition of health, clinicians and researchers began to measure quality of life as positive outcomes of treatments and interventions. This spurred an overabundance of outcome measures aimed at capturing quality of life (Anderson & Burckhardt, 1999). However, neither quality of life nor health has been clearly conceptualized within nursing (Thorne et al., 1998). The lack of conceptual consistency related to the concept of health has created challenges for nurses and other healthcare providers for identifying and measuring appropriate health outcomes that capture quality of care (Sousa, 1999; Staniszewska, 1999).

Much of the discussion within the nursing literature on the conceptualization of quality of life and health stems from opposing ontological and epistemological positions regarding the relationship of humans and health (Thorne et al., 1998). Many nursing theorists conceptualize health as a process and/or normative state and assume that health is a dimension of an individual's life (Thorne et al.). Conversely, theorists who ascribe to the human science paradigm view human beings as unitary whole beings who cannot be separated from their experiences (Mitchell & Cody, 1999). Therefore, health is conceptualized as a reflection of the entire person, as a process, and health is synonymous with expanding consciousness or self-transcendence (Mitchell & Cody; Thorne et al.). For quality of life to be individualized, researchers must take into account the various aspects of life, including health. Thus, the concept *quality of life* encompasses more than

the impact of medical therapies and treatments. Research examining quality of life must define the individual as a whole person (Calman, 1984) and focus on not just physical factors, but also factors that encompass the mind, body, and spirit.

Health is not synonymous with quality of life (Anderson & Burckhardt, 1999). Health may influence quality of life, but they are conceptually different terms. Campbell et al. (1976) found health to be more of a factor for quality of life as one ages. Failure to recognize the many other dimensions, other than health, that influence an individual's assessment of his or her quality of life has created serious disparities between the health care provider's perception of a patient's quality of life and the actual patient's perception (Anderson & Burckhardt). This disconnect between the provider and patient may also contribute to the provider's focus on increasing the quantity of life of the individual while the patient is focused on the quality of the remaining years. Thus, health status and quality of life, as separate concepts, should be measured independently (Anderson & Burckhardt; Smith et al., 1999).

Greenfield and Nelson (1992) refer to health status assessment as "the measurement or evaluation of the health of an individual or patient" (p. MS25). This assessment may include biological indicators, but the emphasis is primarily on indicators such as physical functioning, mental health, and social functioning (Greenfield & Nelson). A meta-analysis was conducted (Smith et al., 1999) to determine whether quality of life and health status have the same meaning or are perceived as two different concepts to patients with chronic diseases. Interestingly, patients gave greater emphasis to mental health when rating their quality of life and more emphasis to physical

functioning when appraising their perceived health status (Smith et al.). Using structural modeling for the factors of quality of life and health status, the researchers demonstrated that individuals perceived quality of life and health status as two distinct concepts. Thus, the two terms should not be used interchangeably (Smith et al.).

Quality of life is a broad, multidimensional concept that includes both positive and negative aspects of life. Understanding quality of life goes beyond the operationalization of the concept simply in terms of health status and functional health status measurements (Farquhar, 1995). Clarity of the conceptual differences in health status, quality of life and life satisfaction is critical to determining how to appropriately measure quality of life (Farquhar).

Health-Related Quality of Life

Despite attempts to alleviate the conceptual confusion between health status and quality of life the distinction has been further obscured by reference to *health-related quality of life* as a measure to describe the individual's experiences and their perception of the effects of health, illness, and treatments on quality of life (Ferrans et al., 2005; Wilson & Cleary, 1995). The term used by early sociological researchers to distinguish between quality of life among the healthy general population and those outcomes relevant to health care researchers (Smith et al., 1999), evolved from a loosely integrated body of research focused on health status, functional ability, and social well-being (Albrecht,

1996). Yet, the measurement of health status is often labeled health-related quality of life (Anderson & Burckhardt, 1999; Greenfield & Nelson, 1992).

Researchers suggest that health-related quality of life refers to a group of health consequences such as decreased functional ability necessary to complete usual daily activities (Lerner & Levine, 1994), while others have defined the concept as broader than health status by including the impact of health on functional status, psychological, social functioning, and well-being (Huguet, Kaplan, & Feeny, 2008; Kaplan, 2003; Jakobsson & Hallberg, 2006). Patrick and Erickson (1993) provided the following definition: “Health-related quality of life is the value assigned to duration of life as modified by impairments, functional states, perceptions, and social opportunities that are influenced by disease, injury, treatments, or policy” (p. 22). Within this definition are five core dimensions of health-related quality of life: resilience, health perception, physical function, symptoms, and duration of life (Patrick & Erickson). Unfortunately, instead of providing conceptual clarity, the term health-related quality of life adds to the confusion because it implies that individuals make distinctions between the parts of their lives that are influenced by health and those that are not (Anderson & Burckhardt, 1999) and tends to exclude the aspects of life that are not related to health such as cultural, political and society (Ferrans et al., 2005). In fact, in some situations, it may be virtually impossible to separate the factors which are considered health-related and those that are not. Despite the dual distinction associated with the term health-related quality of life, the most common domains include physical functioning, emotional well being, social functioning

and role activities, life satisfaction, health perceptions, cognitive functioning, pain, vitality, self-esteem and sleep (Rejeski & Shumaker, 1994).

Since the inception of the term, health-related quality of life has been difficult to separate from the more global quality of life, and unfortunately, the two terms are frequently used interchangeably within the same report (Hawker et al., 1998; Rabenda et al., 2005; Saban, Penckofer, Androwich, & Bryant, 2007). Researchers began using the term health-related quality of life in research reports with the intent of narrowing the focus to the influence of health on quality of life. While health may be a major factor in the assessment of quality of life among certain populations such as older adults, research has also shown that other factors should also be included as potential contributors to quality of life (Farquhar, 1995) For example, in a national population study by the Centers for Disease Control and Prevention (CDC), the domains that conceptualized health-related quality of life included physically unhealthy days, mentally unhealthy days, days with activity limitation, and general health rating (Zahran et al., 2005). However, in a later study of older adults with OA, health-related quality of life was solely conceptualized as physical function (Nunez et al., 2007). Factors such as independence (Loft, McWilliam, & Ward-Griffin, 2003), social support (Gabriel & Bowling, 2004), and perception of control (Netuveli & Blane, 2008) were not included and may influence the older adults' assessment of their quality of life. Sousa and Chen (2002) contend that for most individuals, the dimensions identified in health-related quality of life frameworks have little theoretical foundation, which may potentially result in a set of unrelated variables with no basis for specifying the relationships among the variables. As

a result, certain factors related to quality of life for older adults may be missed or not emphasized.

Quality of Life in Older Adults with Osteoarthritis

Osteoarthritis of the knee is the most frequent form of lower extremity arthritis accounting for 478,000 TKR surgeries in 2004, and for those 65 years and over, the rate of TKR surgeries increased 70 percent between 1995 and 2004 (DeFrances & Podgornik, 2006). In 2006, OA accounted for \$19 billion in hospital charges, an increase of \$4.7 billion since 2004 (Arthritis Foundation, n.d.). Data from the National Health and Nutrition Examination Survey indicate that the prevalence of OA increases with age (Messier, 1994) and affects more women than men (Lawrence et al., 2008; Theis, Helmick, & Hootman, 2007).

A current community study funded by the CDC in Johnston County North Carolina, estimated the lifetime risk of developing knee OA was 44.7% (95% CI 40.0-49.3%) (Murphy et al., 2008). Thus, OA poses a serious public health burden in North Carolina and is representative of the U.S. as a whole. Studies addressing quality of life have demonstrated that on average, quality of life for older adults with OA is lower than the general population (Ackerman, Graves, Wicks, Bennell, & Osborne, 2005; Dominick et al., 2004b; Hirvonen et al., 2006; March et al., 1999; Rabenda et al., 2005), and women reported significantly lower quality of life and physical function than men (Ackerman et al., 2005; Hawker et al., 2000; Keef et al., 2000; Theis et al., 2007). Identifying the

factors that most significantly influence the quality of life of older adults with OA is essential to the development of innovative strategies to improve health outcomes.

Other population and community based studies have examined the effects of arthritis on health-related quality of life, (Dominick, Ahern, Gold, & Heller, 2004a; Hill, Parsons, Taylor, & Leach, 1999) specifically, physical function and disability (Hochberg, Kasper, Williamson, Skinner, & Fried, 1995; Hopman-Rock, Odding, Hofman, Kraaimatt, & Bijlsma, 1996; Jordan et al., 1996). Individuals with OA are at a higher risk of physical disability (Felson et al., 2000) and associated factors such as pain (Scudds & Robertson, 1998), fatigue (Creamer, Lethbridge-Cejku, & Hochberg, 1999), depression (Creamer et al., 1999), and potential loss of independence (Maly & Krupa, 2007). For the older adult, this disease progression may lead to social isolation, a sense of hopelessness, and loss of control (Kee, 2003).

Dominick and colleagues (2004b) examined the relationship between health-related quality of life determinants (pain, general health, mental health, activity limitations, and sleep) among older adults with OA and the utilization of health care services. The researchers found that greater pain was associated with increased odds of visiting a healthcare provider, using pain medications, and having arthroplasty ($p < 0.001$), and contended that understanding the relationship between health-related quality of life factors such as pain, will be useful in anticipating and planning future health care resources. In other studies (Hirvonen et al., 2006; Salaffi, Carotti, & Grassi, 2005), researchers have found older adults with OA exhibited worse physical function, sleeping, vitality, and pain or discomfort ($p < 0.001$) and a lower health-related quality of life score

when compared to a population control. While these studies provide important information regarding the functional ability, pain, and associated use of health care resources of older adults with OA, health-related quality of life was assessed based on the functional ability of the older adult with OA. As a result, there may be aspects of the older adult's perception of quality of life that have not been captured and therefore, not clearly capturing the quality of life of the older adult with OA.

Quality of life for older adults with OA is more than health and functional status. In an attempt to better understand quality of life in older adults, Ferquhar (1995) surveyed individuals aged 65 and older and found that a negative quality of life was related to increased functional limitations, dependency, and decreased social contacts. These results are consistent with later research (Bowling et al., 2002; Gabriel & Bowling, 2004), which found that social relationships and good health are among the top criterion for quality of life in adults ages 65 and older. More specifically, Gabriel and Bowling (2004) interviewed 80 adults ages 65 and older and identified several quality of life themes including: (a) good social relationships, (b) having good health and mobility, (c) having a positive psychological outlook and acceptance of circumstances that cannot be changed, and (d) retaining independence and control over life. Based on these findings, the researchers contend that quality of life research, especially in older adults, should focus on the personal characteristics and circumstances as influential variables as well as the individual's dynamic interactions with society. These study findings are significant for quality of life research because health-related quality of life assessments may not include these factors that are relevant and important to the older adults.

Despite the volume of research and attempts to measure quality of life and health-related quality of life, there is no widely adopted or supported conceptual definition, definitive theoretical framework, or a single instrument of measurement for either concept. This has created much confusion related to the concept of quality of life and a vast numbers of studies that are difficult to compare and synthesize (Smith et al., 1999). Therefore, there remains a significant amount of work to be done related to quality of life, especially quality of life in older adults with OA.

A review of literature of studies focused on older adults with arthritis, including OA, revealed a variety of factors that have been used to conceptualize quality of life. These factors include: physical functioning (Creamer, Lethbridge-Cejku, & Hochberg, 2000; Dawson, et al., 2004; Hirvonen et al., 2006; Huguet et al., 2008; Jakobsson, & Hallberg, 2006; Jones, Voaklander, Johnston, & Suarez-Almazor, 2001; Rabenda et al., 2005; Salaffi et al., 2005), life satisfaction (Blixen & Kippes, 1999; Ferreria & Sherman, 2007), pain (Blixen & Kippes; Dawson et al.; Dominick et al., 2004a; Ferreria & Sherman; Jakobsson & Hallberg; Hawker et al., 1998; Salaffi et al.; Salmon, Hall, Peerbhoy, Shenkin, & Parker, 2001), social functioning (Salmon et al., 2001), role functioning (Jones et al., 2001; Rabenda et al., 2005), mental health (depression) (Ferreira & Sherman; Hirvonen et al.; Huguet et al., 2008; Jakobsson & Hallberg; Lingard, Katz, Wright, & Sledge, 2004), general health status (Hamel, Toth, Legedza, & Rosen, 2008), and vitality (energy/fatigue) (Dominick et al., 2004b; Salmon et al.). This considerably low level of consensus on quality of life factors for older adults coupled with the researcher's neglect to define what is meant by quality of life in their research

reports create confusion regarding the concept (Taillefer et al., 2003) and may result in misinterpretation of study results. Therefore, clearly defining quality of life in research is important. One effective method of providing conceptual clarity to this concept is the use of a conceptual framework.

Conceptual Framework and Quality of Life

The use of a theoretical framework in quality of life research has great utility by providing a frame of reference for variable selection and aiding in improving conceptual clarity (Sousa, 1999). A gap is noted in the literature related to quality of life and older adults with OA and the application of a conceptual framework. This gap is demonstrated by all authors' of studies included in this review failing to acknowledge a conceptual framework, model, or theory as guiding their research.

The consensus of what domains to include among the quality of life models remains a challenge. In a review of literature, Taillefer and colleagues (2003) found over 60 quality of life models between the years of 1965-2001. However, of concern is that at least 25% of the authors did not define the concept of quality of life within their report. Consistent with the previous review of literature, multiple terms were used to denote quality of life, such as satisfaction (19%), functioning (8%), health (11%), and performance (2.9%) (Taillefer et al.). The reviewers also noted that in several studies the authors failed to systematically define quality of life, but instead they gave several definitions without indicating their preference (Taillefer et al.). This further supports the

lack of clarity and consensus related to the domains of quality of life despite the obvious interest in the theoretical development of quality of life models.

In an attempt to better understand the impact of health and disease on quality of life, Wilson and Cleary (1995) developed a disease-based framework: the Wilson and Cleary model of health-related quality of life. Wilson and Cleary integrated two different paradigms of health: (a) the biomedical paradigm held by most clinicians and basic scientist researchers, and (b) the social science paradigm. The biomedical model is focused on understanding relationships and embraces reductionism which is a philosophical view that a complex whole may be understood by breaking it down into fundamental components. Conversely, the social science paradigm is focused on the dimensions of overall well-being and functioning.

The original Wilson and Cleary (1995) model proposed causal linkages between five different patient outcome measurements. Some researchers have noted that the linear flow of the model represents causal relationships; however, reciprocal relationships between the variables are thought to exist but are not represented in the model (Sabanet al., 2007). Conceptually, this approach does not include cultural, societal or political factors (Ferrans et al., 2005), which are particularly important to nurses who tend to adopt a more holistic philosophic worldview of humans as bio-psycho-social-spiritual beings. Therefore, it is difficult to conceptualize quality of life and health without the potential influences of social and cultural, values and beliefs on every aspect of life. For example, cultural values, norms and beliefs help to shape the individual's attitudes and expectations. Thus, if the older adult believes that chronic diseases are an inevitable part

of aging and expects that pain and functional disabilities will worsen with aging, they may be less likely to seek medical treatment for the symptoms and consequently, may experience a lower quality of life. Conversely, if older adults expect to have improved physical function to return to the activities they value and enjoy and to improve their quality of life after surgery, they may have higher expectations of treatments aimed at increasing function and reducing symptoms from chronic diseases to improve their quality of life (Jacobson et al., 2008). Therefore, it is difficult to exclude the cultural, political, and social influences on an individual's health and quality of life.

The revised Wilson and Cleary model (Ferrans et al., 2005) reflected the influence of characteristics of the individual and environment on the dimensions of biological function, symptoms, functional status, general health perception and overall quality of life (see Figure 1). Although Wilson and Cleary (1995) included characteristics of the individual and environment in their original model, they did not specifically address these factors of quality of life in their description of the model. Ferrans and colleagues addressed this lack of conceptual clarity using an ecological model which suggests that at both the individual and environmental levels there are various layers of influence on health outcomes within quality of life that are beyond the scope of health. In the revised model, intrapersonal factors are considered individual characteristics and interpersonal, institutional, community, and public policies are environmental characteristics. The theoretical grounding of these antecedents to quality of life provides greater conceptual clarity and communicates that overall quality of life is influenced by more than health (Ferrans et al.).

In the original model, Wilson and Cleary (1995) contended that measures of health can be viewed as a “continuum of increasing biological, social, and psychological complexity” (p. 60). The authors point out that the direction of the arrows in the model is not meant to imply that reciprocal relationships do not exist or that the absence of arrows represents that there is not a relationship (Ferrans et al., 2005; Wilson and Cleary). Therefore, characteristics of the environment may influence characteristics of the individual which may in turn influence overall quality of life. For example, research has shown that hospitals within certain neighborhoods have poorer outcomes related to symptoms and functional status following TKR surgery and higher complication rates. These poor outcomes may influence the older adult’s expectations (characteristic of the individual) of the TKR and result in the individual not seeking medical care or delaying treatment (Hervey et al., 2003; Losina et al., 2007), which may result in worsening symptoms and ultimately a decrease in quality of life.

The revised Wilson and Cleary model of health-related quality of life (Ferrans et al., 2005) purports that quality of life is not only influenced by factors such as chronic disease, symptoms, and functional status but also by characteristics of the individual and environment, such as expectations and social support, respectively. This model provides a holistic approach to evaluating the older adult’s quality of life and the reciprocal relationships that may influence their perceived quality of life. This holistic model may also provide theoretical strength to the health-related quality of life research in older adults with OA by clarifying critical factors and their relationships (Ferrans et al., 2005). Therefore, the revised Wilson and Cleary model (Ferrans et al., 2005) provides a

comprehensive approach and the theoretical strength needed in conducting quality of life research with older adults who have OA.

Characteristics of the Individual

According to Ferrans and colleagues (2005), characteristics of the individual are categorized as factors that influence health outcomes. These include demographic, biological, psychological, and developmental factors. Demographic factors such as female sex and age have been linked to the incidence of OA in older adults (Felson, 2004), and more specifically, Rabenda and colleagues (2005) found that older age and female were among the major determinants of poor quality of life in individuals with OA.

Race has also been linked to the incidence of OA in older adults (Lawrence et al., 2008). Blacks were more likely than Whites to have radiographic knee OA (Lawrence et al.). For example, it is well documented that racial disparities exist among older adults and the utilization of TKR surgery for treatment of severe OA (Emejuiwe, Jones, Ibrahim, & Kwoh, 2007; Steel, Clark, Lang, Wallace, & Melzer, 2008). More specifically, Whites are three to five times more likely to undergo TKR surgery than Blacks (Figaro et al., 2004; Suarez-Almazor et al., 2005). Studies have demonstrated that the preference of the individual largely contributes to this disparity in utilization and not necessarily provider recommendation biases (Ibrahim et al., 2002; Suarez-Almazor et al.). In fact, in a qualitative study of 94 Black adults with OA, negative expectations of TKR surgery was identified as a common factor influencing the decision to decline the

procedure (Figaro et al.). Some of the participants described receiving information from family or friends that influenced their expectations of TKR (Figaro et al.). Thus, the racial disparities in TKR utilization may be due to individual expectations which are modifiable through target interventions and education.

Psychological factors are modifiable, dynamic responses to interventions and include cognitive appraisals, affective responses, and motivation (Ferrans et al., 2005). An individual's attitudes, beliefs and knowledge toward the illness, treatment or actions are included in the cognitive appraisal. Researchers contend that individuals have internal standards, such as expectation levels, aspirations, personal needs, and personal values, by which judgments are made regarding experiences (Campbell et al., 1976) and quality of life (Wilson & Cleary, 1995). Thus, expectations are a cognitive process (Staniszewska, 1999; Thompson and Sunol, 1995; Uhlmann et al., 1984) with anticipation and beliefs as the defining attributes.

Originating in 1391 from the Latin term *expectare*, the term expectation means to await, hope, anticipate, or look forward to (Partridge, 1958) and was further defined by Linder-Pelz (1982) as "beliefs that a given response will be followed by some event; an event has either a positive or negative valence or affect" (p. 587). Similar to the concepts of health and quality of life, expectations has lacked conceptual clarity and consensus within the literature. Theoretical foundations for expectations are primarily rooted in psychology and more recently marketing research. Although not included by Wilson and Cleary (1995) or Ferrans et al. (2005) as a characteristic of the individual, expectations should be identified as a dynamic, psychological factor. Expectations are governed by an

individual's worldview, are formed in relation to the social and cultural context in which the individual exist, are unique to the individual, develop over time, and aid in decision making (Janzen et al., 2006). Therefore, from a conceptual stance, expectations are a characteristic of the individual that is poorly understood in relation to health (Janzen et al.) but may have great influence on health outcomes and overall quality of life.

Thompson and Sunol (1995) proposed four types of expectations: (a) ideal, (b) predicted, (c) normative, and (d) unformed. Ideal expectations are aspirations, desires, and preferred outcomes that align with the individual's perspective of an outcome. Predicted expectations are realistic, practical or anticipated outcome that matches what the individual actually believes will occur. Normative expectations are what the individual is told will or should occur. Finally, unformed expectations occur when the individual is unable or unwilling to articulate their expectations for various reasons. This may be due to a lack of knowledge, fear, anxiety, or cultural norms. Despite the attempt by Thompson and Sunol to provide conceptual definitions for expectations to be used in empirical research, there continues to be blurring in the literature regarding the definition of expectations.

The focus of expectations in health care has traditionally been related to understanding the placebo effect (Stewart-Williams, 2004). More recently, health care management research has been largely focused on continuous quality improvements in an effort to provide quality care in a changing healthcare structure. Patient satisfaction has been used by health care administrators to determine the acceptable level of care provided. However, using satisfaction scores assumes that if the individual is satisfied,

quality is present. Campbell et al. (1978) proposed that satisfaction is linked to expectations, in that a sense of satisfaction is “heavily influenced by the individual’s past experience and current expectations” (p.10). Additionally, Linder-Pelz (1982) concluded that expectations make independent contributions to satisfaction, rather than satisfaction resulting from the interaction between the expectations and actual experience. Thus, satisfaction and expectations are fundamentally different concepts and when used interchangeably may results in misrepresentation of study findings.

It is possible that an individual may be overall satisfied with their life but not have their expectation met. The congruence between the individual’s beliefs or expectations of how life should be and reality produces a cognitive or emotional response such as happiness or depression, satisfaction or dissatisfaction (Levasseur, Desrosiers, & Noreau, 2004). Thus, expectations may directly or indirectly impact the individual’s quality of life. Researchers contend that if older adults believe that disease symptoms, such as pain and fatigue, are a normal part of aging, they may be less likely to seek medical treatment (Appelt et al., 2007; Figaro et al., 2004; Figaro, Williams-Russo, & Allegrante, 2005) and may not be aware of the efficacy of various treatment options (Victor, Ross, & Axford, 2004). These lower expectations for improved symptoms may potentially lead to a decreased quality of life for the older adult with OA. Therefore, measuring expectations is important for understanding quality of life in this population.

Stewart-Williams (2004) proposed that expectations are acquired by direct personal experiences, suggestion or observation of others. Understanding expectations and how they affect health behaviors and attitudes are crucial to the assessment of health

outcomes. Calman (1984) hypothesized that quality of life is the difference or the gap between the expectations of the individual and their experience at a certain period of time and states:

A good quality of life can be said to be present when the hopes of an individual are matched and fulfilled by experience. The opposite is also true: a poor quality of life occurs when the hopes do not meet with the experience (p. 124-125).

To improve quality of life, the goal should be to narrow the gap between expectations and the experience (Calman). However, research must determine what the individual's expectations are prior to developing interventions targeted at narrowing this gap.

Characteristic of the Environment

According to Ferrans and colleagues (2005), characteristics of the environment are either social or physical. Social environmental characteristics are the interpersonal influences on health such as family, friends, health care professionals, cultural norms and values. As noted in the model, characteristic of the environment impact all antecedents of quality of life just as characteristics of the individual. Therefore, characteristic of the environment should be included in quality of life research.

Studies of older adults with OA have more commonly included an evaluation of socioeconomic status, such as income and residential status (community dwelling or nursing home) (Dominick et al., 2004a) as environmental factors. In most cases, they are

used to provide a description of the sample. However, some studies have specifically examined the influence of certain environmental factors on health outcomes of those with OA. For instance, older adults living in poorer neighborhoods may not be able to afford treatments or therapies for OA which may positively impact their quality of life. Research reports have demonstrated that Blacks are more likely than Whites to have TKR surgery performed by surgeons with lower volume case loads or in hospitals with lower volumes (Emejaiwe et al., 2007; Losina et al., 2007) which may result in poor outcomes (Hervey et al., 2003). Thus, access to health care facilities and treatments may also influence health outcomes and the individual's health care decisions, expectations, and ultimately, overall quality of life.

Hawker and colleagues (2006) examined the predictors of first time total joint arthroplasty and found that among adults age 55 and older with disabling hip and/or knee arthritis, education level, but not income or sex, was a significant predictor of having total joint arthroplasty when willingness was excluded from the model. These findings raise the question of the relationship between education level and health literacy regarding the indications for and risk associated with total joint arthroplasty and how this impact the individual's quality of life. Consequently, more research is needed to better understand the impact of socioeconomic status on quality of life for older adults with OA.

Other important environmental factors that may influence quality of life in older adults and should be included in research are social relationships and social support (Ashida & Heaney, 2008; Blixen & Kippes, 1999; Ferreira & Sherman, 2007). Research has indicated that more supportive relationships are related to positive psychological and

physical health outcomes (Seeman, 2000). Ashida and Heaney proposed that a lack of social connectedness may result in feelings of loneliness for the older adult. Symptoms of OA such as pain and fatigue along with decreased functional status may result in a lack of independence and inability to remain engaged in society (Ashida & Heaney). This in turn may result in decreased quality of life for the older adult with OA. However, further research is needed to examine the characteristic of the environment that most impact overall quality of life from a holistic perspective.

Biological Function

Biological function according to the revised Wilson and Cleary model (Ferrans et al., 2005) includes the dynamic processes that support life. Further, alterations in biological function may affect other factors, such as symptoms, functional status, and general health perception, and ultimately, quality of life through an indirect path as noted in the model with arrows (see Figure 1). Also, individual characteristics, such as age and sex, may directly influence an individual's biological function by increased vulnerability for OA which may directly influence symptoms and indirectly influence quality of life.

A specific biological factor, such as body mass index (BMI), may also increase an individual's vulnerability of developing OA (Felson et al., 2000; Messier, 1994; Murphy et al., 2008; Zhang & Jordan, 2008) and may affect symptoms associated with OA. For example, increased BMI most likely affects radiographic knee OA by causing excess force on the joint (Felson, 2004) and thus, results in the symptom of pain. More recently,

data from the Arthritis, Diet and Activity Promotion Trial indicated that a reduction in BMI was strongly associated with a reduction in knee force (Messier, Gutekunst, Davis, & DeVita, 2005). Therefore, a change in biological function or a decrease in an individual's BMI may directly affect symptoms such as pain and indirectly affect quality of life.

Symptoms

Symptom Pain

Osteoarthritis pain is a common symptom among older adults that usually results in functional limitations which influences their quality of life (Blixen & Kippes, 1999; Creamer et al., 2000; Jakobsson and Hallberg, 2006; Yoon & Doherty, 2008). Nearly 41% of older adults aged 65 and older report hip or knee pain (Dawson et al., 2004). However, despite this high prevalence of pain among older adults, pain is not a normal consequence of aging. Dominick et al. (2004b) reported that individuals with OA reported 3.7 more days of pain than the population control group without OA.

Many older adults live with persistent, uncontrolled pain, which can have enormous consequences for their quality of life. Individuals, including older adults, who have persistent pain may become anxious about their pain and engage in avoidance behaviors due to the fear of pain (Vlaeyen & Linton, 2000). These avoidance behaviors may lead to decreased physical function and subsequent decreased quality of life for the older adult. In fact, the majority (68%; N=887) of older adults who reported

musculoskeletal pain were three times more likely to have functional limitations (Scudds & Robertson, 1998). The consequences of chronic pain among older adults are numerous and include other symptoms such as depression (Creamer, Lethbridge-Cejki, & Hochberg, 1999; Dickens, McGowan, Clark-Carter, & Creed, 2002), fatigue (Bennett et al., 2002; Creamer et al., 1999), social isolation, (Ashida & Heaney, 2008), a sense of helplessness (Creamer et al., 1999, 2000), limitations in performing daily activities (American Geriatric Society, 2002), and has been associated with poor quality of life (Chen, Devine, Dick, Dhaliwal, & Prince, 2003).

Symptom Depression

Research has demonstrated that individuals with arthritis have a higher prevalence of depression as compared to those without arthritis (Dickens et al., 2002). A review of literature by Blixen and Kippes (1999) revealed that pain and disability were the most significant predictors for depression among individuals with arthritis. Also, arthritis severity accounts for up to 38.5% of the variance in depression of older adults with OA (Sale, Gignac, & Hawker, 2008). More specifically, based on the National Health Survey data from 2002, one in four adults with arthritis report frequent depression (Shih, Hootman, Strine, Chapman, & Brady, 2006). Lin and colleagues (2003) demonstrated in a randomized control trial that improved depression care resulted in decreased pain as well as improved function and quality of life among older adults with arthritis. However, many times this depression may go undetected by the health care professional and, if not properly assessed and treated, may result in a downward trajectory of health for the older

adult and a lower quality of life. Additionally, higher levels of depressed mood were significantly ($p < 0.001$) associated with being a female, experiencing greater pain, and fatigue (Sale et al., 2008). Thus, older adults, especially females with OA are more vulnerable to depression and research focused on effective interventions and strategies targeted to older women with OA is essential.

Symptom Fatigue

Fatigue is a non-specific, common symptom among older adults and has been associated with aging (Liao & Ferrell, 2000). However, fatigue in older adults with OA has not been well studied (Powers, Badley, French, & Hawker, 2008). Many older adults consider fatigue as a normal part of aging and may alter their lifestyle in an attempt to cope with the symptom.

The relationship of pain and fatigue in older adults with OA is also not well studied (Murphy et al., 2008; Wolfe, Hawley, & Wilson, 1996). Bennett and colleagues (2002) found that pain and fatigue resulting from medical conditions such as OA were strongly associated with lower levels of physical, role, and social functioning. Murphy et al. (2008) compared women age 55 and older with OA to an age-matched control group of healthy women to examine daily life patterns of pain and fatigue. Through an observational design, the researchers found that fatigue escalated throughout the day for the OA group and was most strongly associated with physical activity ($\beta = -30.1$, $p = 0.04$). Thus, older adults with increased fatigue from OA may be less likely to engage in physical activity which may negatively affect their quality of life. For example, in a

cross-sectional study of older adults age 65 years and older with chronic diseases (including OA), researchers found that physical activity mediated the impact of the chronic condition on several health outcomes such as pain (12% mediation), mobility limitations (27% mediation), and emotional well-being (16% mediation) (Sawatzky, Liu-Ambrose, Miller, & Marra, 2007); thus, demonstrating a potential reciprocal relationship between the factors of pain, fatigue, physical function and quality of life (Penninx, Leveille, Ferrucci, van Eijk, & Guralnik, 1999). According to Ferrans et al. (2005), it is crucial to understand the relationship of physical and emotional symptoms to better understand the older adults' quality of life. Understanding how an individual experiences, evaluates, and interprets his or her symptoms, the relationship between those symptoms and how those relationships are influenced by characteristics of the individual and environment are essential to better understanding quality of life in older adults.

Functional Status

Wilson and Cleary (1995) defined functional status as the individual's ability to perform physical, social, role, and psychological function. Leidy (1994) refers to functional status as the entire domain of functioning. Therefore, this multidimensional concept characterizes the individual's ability to perform the activities of daily living, fulfill usual roles, and maintain health and well-being (Bennett et al., 2002; Leidy). Functional status includes four dimensions: functional capacity, functional performance, functional reserve, and functional capacity utilization (Leidy). Among most studies

evaluating quality of life in older adults with OA, functional status is measured by the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) (Creamer et al., 2000; Ethgen et al., 2004; Jones et al., 2001). This instrument consists of three subscales (pain, stiffness, and physical functioning with normal daily activities). According to the revised Wilson and Cleary model of health-related quality of life (Ferrans et al., 2005), multiple factors may influence an individual's functional status. For example, Kee (2003) found that among older adults with OA, pain (symptom) and social support (characteristic of the environment) significantly influenced the psychological status and physical functioning of the individual. Furthermore, Bennett and colleagues found in a cross-sectional study of community dwelling older adults that pain and fatigue, resulting from medical conditions such as arthritis, were strongly associated with decreased levels of self-reported physical, role and social functioning. Pain and fatigue (symptoms) were the mediating factors between the medical condition (biological function) and physical function (functional status). Research has also shown that limitations to physical function are associated with poor quality of life in older adults with OA (Ackerman et al., 2005; Jakobsson & Hallberg, 2006) and higher psychological distress such as depression (Ackerman et al.; Theis et al., 2007). Functional status has numerous reciprocal relationships with other factors of quality of life among older adults.

General Health Perception

Ferrans et al. (2005) describes the general health perception to be a synthesis of the various aspects of health in an overall rating. General health perceptions are influenced by all of the other factors in the model and, according to Ferrans and colleagues, may be assessed in one global rating of health. General health perception is usually assessed in terms of satisfaction among the studies of older adults with OA (Hawker et al., 1998; Lingard et al., 2006; Mahomed et al., 2002); more specifically, the individual's overall health status rating. However, as previous discussed, a rating of general health status should not be used interchangeably with an individual's rating of quality of life. As noted in the model (see Figure 1), general health perception may influence quality of life.

Summary

Quality of life research for older adults with OA has primarily focused on health-related quality of life which has included physical function and health status. This narrow conceptualization combined with the lack of inclusion of individual expectations of outcomes has resulted in a gap in our understanding of quality of life for older adults with OA. Traditionally, quality of life among older adults with OA is measured by the Medical Outcomes Study 36-item short form (SF-36) (Ware & Sherbourne, 1992). This general health questionnaire has been used to measure quality of life (Gandhi, Davey, & Mahomed, 2008; Salmon et al., 2001), health-related quality of life (March et al., 1999;

Rabenda et al., 2005; Salaffi et al., 2005), and health status (March et al., 2002) among studies of older adults with OA. The SF-36 is a well established measurement of health status and not a measure of quality of life.

For those in practice, the revised Wilson and Cleary model of health-related quality of life (Ferrans et al., 2005) would provide a framework to identify areas to implement or improve public health approaches to arthritis as part of the *Health People 2010* health objectives (U.S. DHHS, n.d.). Empirically understanding the relationships between the domains of quality of life and the influence of individual expectations will provide the necessary information for innovative interventions addressing self-management of symptoms, improved patient-provider communication regarding symptoms and expectations for outcomes, and weight management programs to reduce the vulnerability of certain older adults for OA. These strategies are congruent with the *Health People 2010* health objectives identified for addressing the growing arthritis burden (Theis et al., 2007). The model will also guide opportunities for those in practice and policy makers to work collaboratively to evaluate patterns of relationships among the factors that influence quality of life and to enhance the conceptual and methodological approaches to quality of life research among older adults with arthritis.

The revised Wilson and Cleary model of health-related quality of life (Ferrans et al., 2005) also challenges clinicians, researchers and policy makers to become more accountable in their practice, actions, and decisions regarding care. There continues to be growing popularity of quality of life as an endpoint in the evaluation of healthcare outcomes which are essential to evaluating healthcare intervention strategies and policies

(Sousa, 1999). Outcome measurements allow the clinician, policymakers, administrators, and researchers to make determinations regarding the effective strategies for quality of care which is essential to health care (Sousa). Future research utilizing a comprehensive, quality of life conceptual framework is necessary to explore the relationships between health-related factors, characteristics of the individual and environment, and quality of life. Gaining a more holistic understanding of quality of life for older adults with OA will add to positive outcomes and quality patient care.

CHAPTER III

METHODS

Design

The principal investigator (PI) of this non-experimental research study employed a cross-sectional, correlational design to examine factors that influence the quality of life for older adults with osteoarthritis (OA) prior to total knee replacement (TKR) surgery. Cross-sectional designs are appropriate for describing the status of the phenomena and/or the relationship among the phenomena at one point in time. (Polit & Hungler, 1999). For example, in older adults who were scheduled for TKR surgery, a cross-sectional design may be used to collect data from the older adults at one point in time pre-operatively to describe their current quality of life and to identify the factors that may influence their quality of life. This design was appropriate because this study was not examining changes in quality of life over time.

A correlational design was also used. This type of design allowed the researcher to examine the interrelationships of the latent variables such as quality of life and the independent variables that cannot be manipulated (Tabachnick & Fidell, 2007). A correlational design was appropriate for this study because it is not ethically possible to manipulate the independent variables such as biological function, symptoms, functional status, general health perceptions, or demographics.

Setting

Subjects were initially recruited from two large orthopedic offices in central North Carolina. The orthopedic surgeons from these orthopedic practices provide services for total joint replacements, including TKR. The practices were centrally located within the state and their population of patients receiving joint replacement surgery is diverse. Participants were also recruited from five area hospital and clinic pre-operative joint classes. Data collection occurred at a location convenient to the individual participant, such as their home, the library, other locations specified by the participant.

Sample

A convenience sampling design was used to obtain participants from the orthopedic clinics and pre-operative joint classes. Inclusion criteria included: (a) first time joint replacement surgery, (b) at least 50 years of age or older, (c) able to speak and understand the English language, (d) OA of the knee, (e) native born to United States. Exclusion criteria included: (a) a diagnosis of dementia or other cognitive impairment as reported by the patient and/or family member, and (b) scheduled double knee replacement surgery. Potential participants who were eligible for this study were identified by the orthopedic office surgery scheduler and were contacted by the physician assistant or surgery scheduler via telephone. At that time, potential participants were provided with general information regarding the purpose and time involved to participate in the study. The physician assistant and surgery scheduler were provided with a

telephone contact script to use as a guide while talking with the potential participants. Once the individual agreed, their name and telephone number were forwarded to the PI by the physician assistant and/or the office surgery scheduler. The PI then contacted each individual to further explain the study, answer questions, and set up a time for data collection. Those individuals who chose not to participate were asked to identify the reason for their decision in an attempt to identify and control for selection bias.

Participants were also recruited from five area pre-operative joint classes. Four of the classes were sponsored by area hospitals and one was sponsored by an orthopedic clinic physical therapy department. Informational flyers were distributed to the participants prior to the class by the instructors. Class instructors were also provided with a script to read to the class about the study. Participants were asked to provide their name and phone number on a list if they were interested in talking with the PI about the study. This list was given to the PI by the course instructor. The PI then followed the same procedure for contacting the participant as indicated for the orthopedic clinics.

The appropriate a priori sample size for this study was determined using nQuery Advisor software. A total of 78 subjects has 80% power to detect a R^2 equal to 0.20 with 11 predictor variables at a significance of 0.05. This effect size is estimated from the findings of Saban and Penckofer (2007), who found that differences between fulfilled and predicted expectations significantly predicted postoperative quality of life in lumbar spinal surgery patients with a reported R^2 of 0.239. A post hoc power analysis indicated a sample of 75 subjects has 99% power to detect a R^2 equal to 0.62 with 11 predictor variables at a significance level of 0.05.

All ethnic and racial groups were included, as well as both sexes, as long as they meet the inclusion criteria. The orthopedic clinics were centrally located in a metropolitan area of the Southeast U.S. and serves individuals of various races and socioeconomic status levels. However, because of the use of a convenience sample, generalizability of the results are limited to individuals similar to those who chose to participate in the study.

Human Subject Protection

The study was reviewed for approval by the Institution Review Board (IRB) of The University of North Carolina at Greensboro and by the IRB boards of the four hospitals. All participants were informed of the purposes of the study and their risk and benefits of participating. The consent form was written at a fifth grade reading level to ensure readability. The consent was read to the participants by the PI and an opportunity to ask questions was provided. Once the individuals agreed to participant, they were asked to sign the consent. They received a copy of the consent which included the name and contact information of the PI.

Only one hospital required participants to sign a Privacy of Health Information (PHI) form along with their consent to participate. This form was provided to the PI by the hospital's IRB office. The form remains on file with the informed consent in a locked cabinet in the PI's office according to hospital IRB standard procedure.

Participant confidentiality was maintained at all times. A master list of the participant names and consent forms is kept in a lock cabinet separate from all data collection forms. Only members of the research team have access to this locked file. All data collection forms are also kept in a separate locked file in the PI's office. All data collection forms used codes in the place of individual names or any other personal identifiers such as medical record numbers. All data collection forms were completed by the PI who is trained in conducting research with human subjects and has signed confidentiality forms. Data files used only coded information and are kept on the PI's password protected computer with a separate memory key for backup. This data file is stored in the locked cabinet with the data collection forms.

Instruments

Six instruments were used for data collection: (a) PI developed Demographic Information Form, (b) Hospital for Special Surgery Knee Replacement Expectations Survey, (c) Medical Outcomes Study Social Support Survey, (d) Western Ontario and McMaster Universities Osteoarthritis Index, (e) Geriatric Depression Scale Short Form, and (f) Quality of Life Index-Arthritis version III.

Demographic Information Form

The Demographic Information Form (see Appendix A) was designed by the PI to collect information not captured by the other instruments. The form included individual characteristics (i.e., age, sex, race, marital status, employment status, number of

individuals living in the home, educational level, and income). Information was also collected regarding the planned date of their surgery, surgeon, and hospital. Height and weight measurements for body mass index calculation were collected by the PI on each participant using standardized scales. Participants were asked to rate their current pain and fatigue on two separate numeric rating scales, zero (no pain/fatigue) and ten (extreme pain/fatigue). Participants were also asked to rate their current life satisfaction. This was measured with one question: “In general, how satisfied are you with your life?” and participants were asked to indicate their response on a 100 mm visual analogue scale.

Hospital for Special Surgery Knee Replacement Expectation Survey

There is limited research supporting measurements of individual expectations of TKR surgery. Many times the investigator develops their own tool for measuring expectations which lacks validity and reliability (Saban & Penckofer, 2007). Mancuso and colleagues (2001) developed the Hospital for Special Surgery Knee Replacement Survey (see Appendix B) specific to adults undergoing TKR surgery as a method of measuring patient’s expectations. The results of their study showed that expectations are very individualized and vary by diagnosis, individual characteristics, and functional status (Mancuso et al., 2001). The Hospital for Special Surgery Knee Replacement Expectations Survey asked the individual to rate their expectations for improvements related to pain, actual physical function, and psychological well-being. Participants were asked to rate the importance of their expectations on a five-point scale, with 1= expect complete improvement and 5 = I do not have this expectation. The responses were scored

in reverse order from four to zero and summed (potential raw scores of 0 to 76). This raw score was then transformed $[(\text{raw score}/76) \times 100]$ to a score from 0 to 100. Higher scores indicate high expectations for improvement in more items (Mancuso et al.). The items of the survey were simple, took less than five minutes to complete, and addressed symptom-related, psychosocial, and functional expectations (Mancuso et al.).

There is also limited research supporting the psychometric properties of the Hospital for Special Surgery Knee Replacement Expectations Survey. The survey was developed from interviews with 161 patients scheduled for TKR surgery and initial test-retest reliability kappa statistics ranged from 0.4 to 0.8 (Mancuso et al., 2001). Reliability was confirmed in a later study by Mancuso and colleagues (2008) with a Cronbach alpha of 0.79. Test-retest reliability was confirmed by comparing responses obtained during two separate interviews four days apart (Mancuso et al., 2008). Despite the limited amount of data to support the utility of the measurement, the Hospitals for Special Surgery Knee Replacement Expectations Survey was used due to the lack of a more established instrument. Permission to use the tool was obtained by the researcher.

Medical Outcomes Study (MOS) Social Support Survey

The MOS Social Support Survey (see Appendix C) is a multidimensional, 19-item survey developed to assess the social support of adults. The survey has four functional support scales: (a) emotional/informational (8 items), (b) tangible (4 items), (c) affectionate (3 items), and (d) positive social interactions (3 items); and one additional item (Sherbourne & Stewart, 1991). Responses were scored on a 5-point scale from 1 (none of

the time) to 5 (all of the time). Total survey mean scores were calculated by dividing the total score by 19 so that total scores range from 1 to 5 with higher scores indicating more support available. Scores were also calculated for each of the 4 subscales by calculating the average of the scores for each item in that subscale. All scales have demonstrated reliability (Cronbach alphas >0.91) (Sherbourne & Stewart; Sherman, 2003) and dimensionality of the tool is supported by high convergent and discriminate validity of the items.

Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC)

The WOMAC index (see Appendix D) is a widely used measurement (Bellamy 2009; Hamel, et al., 2008; Lingard et al., 2006) to assess the disability related to OA of the hip and knee. The scale consists of three sub-scales: pain (5 questions), stiffness (2 questions), and physical function (17 questions). There are three response options in which the researcher may use for participants depending on the population of interest, educational level, and other factors. These response options include: (a) Likert scale, (b) visual analogue scaling (VAS), and (c) numerical rating scale format. For the purposes of this study, the participants were asked to respond to the items on functioning in the form of a five-point Likert scale (0 = none, 1= mild, 2 = moderate, 3 = severe and 4 = extreme). Each sub-scale was summed to obtain a separate score with lower scores indicating lower levels of symptoms or physical disability, thus greater physical function.

One of the initial studies for validation of the WOMAC administered both versions of the scale (Likert and VAS) to patients with OA of the hip and knee (Bellamy,

Buchanan, Goldsmith, Campbell, & Stitt, 1988). The researchers reported Cronbach's alpha for the Likert scale version pain, stiffness, and physical function subscales as 0.86, 0.90, and 0.95, respectively; thus, demonstrating good internal consistency (Bellamy et al., 1988). Construct validity for the WOMAC has been determined by comparing the measure with other generic measures such as the SF-36 (Salaffi et al., 2005). Testing for convergent and divergent validity between the WOMAC and SF-36 revealed a correlation between the WOMAC pain dimension and the SF-36 physical functioning scale (Spearman's rho = -0.561) (Salaffi et al., 2005). More specifically, Salaffi and colleagues (2005) found the WOMAC to be the instrument of choice for assessing the consequences of knee OA in older adults and takes about five minutes to complete.

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Geriatric Depression Scale Short Form

The Geriatric Depression Scale (GDS) is a very well tested and extensively used instrument to screen for depression in older adults. The tool was originally created as a brief 30-item questionnaire which asks participants to respond yes or no to questions regarding how they have felt over the past week (Sheikh & Yesavage, 1986). The GDS short form (GDS-SF) (see Appendix E) was later created from the questions on the long form that had the highest correlation with depressive symptoms in validity studies (Sheikh & Yesavage). The GDS-SF consisted of 15 items in which the participants were asked to answer in the same manner as the long form. Ten of the questions on the GDS-SF indicate the presence of depression when answered positively, while five indicate

depression when answered negatively and are reversed coded to get a total score (Kurlowicz & Greenberg, 2007). Total scores of 0-4 are considered normal, 5-8 indicate mild depression, 9-11 indicate moderate depression, and 12-15 indicates severe depression (Kurlowicz & Greenberg). The GDS-SF was completed in about 5-7 minutes for each participant and has been used extensively in the community dwelling older adults (Belza, Henke, Yelin, Epstein, & Gilliss, 1993; Crane, 2005).

The GDS has demonstrated good validity and reliability both in research and clinical practice with 92% sensitivity and 89% specificity when compared to other diagnostic criteria (Kurlowicz & Greenberg, 2007). In a recent study by Bass and colleagues (2008), the GDS-SF was compared to the Beck Depression Inventory for evaluating depression pre-operatively in patients undergoing major, non-cardiac surgery (N=1043). The results indicated a high correlation between the GDS-SF and the Beck Depression Inventory for detecting depression among all age groups (i.e., elderly age 60-90, $r = 0.65$; $p = 0.01$) (Bass, Attiz, Phillips-Bute, & Monk, 2008). The results further support the use of the GDS-SF in pre-operative surgical patients as a brief assessment tool.

General Health Perception

According to the Wilson and Cleary (1995), general health perception is the satisfaction of the individual with their health and the value of their symptoms and functional ability. General health perception was measured by one question on the

Demographic Information Form: “How would you rate your current health on a scale from 1 to 10 with 1 = poor and 10 = excellent?” as recommended by Ferrans et al (2005).

Quality of Life Index-Arthritis Version III

The Quality of Life Index-Arthritis version III (QLI-A) provided a measure for quality of life in terms of satisfaction and importance (see Appendix F) (Ferrans & Powers, 1985, 1992). These sections, satisfaction and importance, consists of 35 items each that assess quality of life while taking into account four life domains: (a) health and functioning, (b) psychological/spiritual, (c) social and economic, and (d) family (Ferrans & Powers, 1985). Five scores are produced which measure quality of life in each of the four domains and overall quality of life. These domains form the basis for the generic Quality of Life Index (QLI), and items significant to certain chronic diseases were added to create the illness-specific versions. For example, two questions on the QLI-A version assess the individual’s ability to go places and to do things with their hands and arms. The total score reflects not only satisfaction but also how much the individual values each of the four domains (Ferrans & Powers, 1992).

Individuals were first asked to rate the degree to which they are satisfied with a certain aspect of their life as measured by a 6-point Likert scale with 1= very dissatisfied and 6= very satisfied. Secondly, the individual was asked to rate the level of importance of that aspect in their life, which is also measured by a 6-point Likert scale with 1= very unimportant and 6= very important. The satisfaction scores were recorded and weighted according to the individual’s importance scores, which resulted in the overall quality of

life score. The final scores ranged from 0 to 30, with a higher score indicating a higher overall quality of life. Scores were calculated for each subscale which allowed for further statistical analysis to explore how each factor influenced the various domains of quality of life (Ferrans & Powers, 1992).

The QLI-A was appropriate for use in this study because it is a self-report measure allowing the older adult the opportunity to provide their own ratings of satisfaction and importance which may be different from those of the provider or researcher. Also, this tool was specific to individuals with arthritis and may have captured those aspects of quality of life that are missed by generic health status assessments such as the SF-36. Finally, the QLI-A provided a global measure of quality of life.

Although no specific data were found to support the content and construct validity of the QLI-A, there has been research to demonstrate the psychometric properties of the QLI. Ferrans and Powers (n. d.; 1985) have demonstrated that the QLI is reliable with good content and construct validity. Construct validity was supported by Ferrans and Powers (1992) who used the contrasted groups approach, while convergent validity was provided by a strong correlation between QLI scores and a single item life satisfaction assessment ($r = .77$). This single-item measure ask how generally satisfied an individual is with life (Campbell et al., 1976). Several studies have demonstrated moderate to strong correlations (ranging from 0.61-0.93) between the QLI and life satisfaction scores (Ferrans & Powers, 1992). However, there are no data at this time to support the correlation between QLI-A and life satisfaction. Thus, the participants of the current

study were asked to rate their overall life satisfaction on a VAS 100 mm scale to obtain a continuous number. This allowed for statistical correlations to be performed addressing this gap in the literature.

Reliability has also been well established for the QLI. Initial testing of the generic instrument, Cronbach's alpha was 0.93 for graduate students and 0.90 for in-unit hemodialysis patients followed by test-retest correlations of 0.87 within two weeks for graduate students and 0.81 after one month for hemodialysis patients (Ferrans & Powers, 1985). Good internal consistency reliability of 0.93 for the entire scale with subscales of 0.87 for health and functioning, 0.82 for socioeconomic, 0.90 for psychological/spiritual, and 0.77 for family subscales has been demonstrated (Ferrans & Powers, 1992).

Procedures

The PI informed the physician assistant and the office surgery scheduler of the purposes of the study and provided them with a script outlining the study that was used to inform potential participants of the study. Once the participant had scheduled a date for TKR surgery with the orthopedic surgeon, the physician assistant or office surgery scheduler contacted the individual via telephone and read the script outlining the study to them. Once an individual had expressed an interest in participating, the physician assistant and/or office surgery scheduler obtained permission to release their name and telephone number to the PI. Once this permission was granted the physician assistant or

office surgery scheduler notified the PI of the potential participant and their name and telephone information was communicated to the PI via a list in a sealed envelope picked up from the orthopedic office by the PI and kept in a locked box. Once the participants had been contacted, the list was shredded by the PI. The PI contacted the potential participants via telephone to ensure they meet the inclusion criteria and provided further details of the study. Individuals were given the opportunity to ask questions about the study. If the individual agreed to participate and the inclusion criteria were satisfied, an appointment was made with the individual and the PI for the data collection interview. Interviews were scheduled at a time and location convenient to the participant. A reminder call was made by the PI to the participant either the day prior to or the morning of the interview appointment to confirm the meeting.

Participants were also recruited from total joint pre-operative educational classes sponsored by area hospitals or orthopedic clinics. A written script outlining the study was read by the class instructor or the PI to the class attendees prior to the class. Interested individuals were given a flyer describing the study and were asked to provide the class instructor with their name and telephone number which would be shared with the PI in the same manner as described above. The PI was available outside of the classroom following several of the education classes for interested individuals to approach the PI in person. Individuals also contacted the PI directly to express interest either by telephone or electronic mail. Once the individual expressed interest in participating, the same procedure was followed as outlined above for those from the orthopedic clinics.

Each interview began with a review of the informed consent. Additionally, PHI consent forms were reviewed only for participants recruited from a specific medical center according to the hospital's IRB protocol. Participants were given an opportunity to ask questions prior to data collection. Once all of the questions were answered, the participants were asked to sign the consent form and were provided with a copy for future reference. Participants were asked to complete six instruments: (a) Demographic Information Form, (b) Hospital for Special Surgery Knee Replacement Expectations Survey, (c) MOS Social Support Survey, (d) WOMAC, (e) GDS-SF, and (f) the QLI-A. During data collection the questions were read to the participants by the researcher to ensure clarity. This process was to ensure understanding of the questions and to control for literacy. The participants were also provided with Likert scales to refer to during the interview as a visual aid. Most interviews lasted approximately 45-60 minutes each. There were no modifications to the instruments. At the conclusion of the interview, participants were provided with a thank you card from the PI and \$20.00 cash as a token of appreciation for their participation. All data were entered and all analyses were performed using SPSS v 18.0 (SPSS, Inc., Chicago, IL).

Data Analyses Plan

Initially, the data were checked and verified with the hard data files to ensure accuracy for data entry. Data analyses began by generating descriptive statistics for each variable. This included means, standard deviations, range, kurtosis, and skewness for

interval-level variables. Frequency and percentages were calculated for nominal and ordinal level variables. All assumptions for normality were checked and data were transformed as needed to satisfy statistical assumptions using Tabachnick and Fidell's (2007) guidelines. The data were plotted using scatter plots to determine outliers. Two significant outliers were found and the hard data file were again used to verify accuracy in data entry. Scores were calculated for the Hospital for Special Surgery Knee Replacement Expectations Survey, the MOS Social Support Survey, the WOMAC, the GDS-SF, and the QLI-A following recommendations noted by the instrument's authors. Cronbach's alphas were calculated for each instrument.

Data Analyses for Specific Aims

The purposes of this study were to explore the expectations of older adults with medically diagnosed OA who are scheduled for TKR surgery and to examine factors that influence the older adult's quality of life prior to TKR surgery. The following outlines the data analysis plan for each specific aim.

Specific Aim #1: Describe the expectations of older adults with OA who are scheduled for TKR surgery.

Question (Q)1. What are the expectations of older adults with medically diagnosed OA who are scheduled for TKR surgery?

To determine the expectations of older adults with medically diagnosed OA who are scheduled for TKR surgery, the total score of the Hospital for Special Surgery Knee Replacement Expectation Survey was calculated for each participant. Responses were

transformed according to the survey's author with higher scores indicating expectations for more improvement on more items. The mean, standard deviation, minimum, and maximum for the total Hospital for Special Surgery Knee Replacement Expectation Survey were then calculated.

Q2. Do characteristics of the individual (age, sex, and race) significantly explain the variance in expectations of the older adults with medically diagnosed OA who are scheduled for TKR surgery?

All variables were checked for multicollinearity in two ways. First, the correlation matrix was examined. If two variables were correlated at 0.85 or higher, one variable would be eliminated from the multiple regression analysis or a separate model would be created. Second, the variance inflation factor and the tolerance level of all independent variables in the multiple regression model were evaluated. A variance inflation factor greater than 10 and a tolerance level of less than 0.10 were used to identify multicollinearity and to determine if certain variables should be eliminated (Tabachnick & Fidell, 2007). Frequency distributions were used to determine outliers within each variable because extreme outliers may impact the regression results in an unacceptable manner. Multivariate outliers were detected through standardized residual values greater than 3.0 or less than -3.0. Analysis of residuals was also used to determine outliers.

Standardized residual scatterplots were used to check multiple regression assumptions, such as linearity, homoscedasticity and normality. Violations of the assumptions for multiple regression were determined by observing the shape of the distribution scatterplots. Data was transformed in an attempt to stabilize the variance and

achieve linearity and normality when any of the assumptions were violated (Polit & Hungler, 1999).

For this multiple regression analysis, all predictor variables (age, sex, and race) were entered simultaneously into the model to determine how well the three variables explained the variance in expectations. Statistical significance for each variable and the overall model was set at alpha less than or equal to 0.05.

Specific Aim #2: Examine the influence of the expectations of older adults with medically diagnosed OA who are scheduled for TKR surgery on quality of life.

Q3. Do expectations significantly explain the variance in quality of life for older adults with medically diagnosed OA who are scheduled for TKR surgery?

Simple linear regression analysis was used to determine the correlation coefficient or the R^2 statistic; which indicated the proportion of the variance in the dependent variable (quality of life) that was accounted for by the independent variable (expectations). Statistical significance was set at alpha less than or equal to 0.05.

Q4. When controlling for expectations, do biological function (BMI), symptoms (pain, fatigue, depression), functional status, and general health perception, characteristics of the individual (age, sex, and race), and characteristic of the environment (social support) significantly explain the variance in quality of life for older adults with medically diagnosed OA who are scheduled for TKR surgery?

The statistical analysis for this question was similar to that of question two. Data were checked for linearity, multicollinearity, homoscedasticity, outliers, and normality. For this multiple regression analysis, expectations were entered into the first block and

the other 10 independent variables were entered simultaneously into the second block. This analysis determined the specific amount of variance in overall quality of life that was explained by the variables (characteristics of the individual and characteristic of the environment, biological function, symptoms, functional status, and general health perception) beyond that explained by expectations. Statistical significance for each variable and the overall model was set at alpha less than or equal to 0.05.

Specific Aim #3: Examine the influence of the factors on quality of life for older adults with medically diagnosed OA who are scheduled for TKR surgery.

Q5. Do biological function (BMI), symptoms (pain, fatigue, and depression), functional status, general health perception, characteristics of the individual (age, sex, race, and expectations), and characteristic of the environment (social support) significantly explain the variance in quality of life for older adults with medically diagnosed OA who are scheduled for TKR surgery?

The statistical analysis for this question was similar to that of question two. Data was checked for linearity, multicollinearity, homoscedasticity, outliers, and normality. All predictor variables were entered simultaneously into a multiple regression model to determine how well the 11 variables explained overall quality of life. Statistical significance for each variable and the overall model was set at alpha less than or equal to 0.05.

Q6. When controlling for characteristics of the individual (age, sex, race, and expectations), do biological function (BMI), symptoms (pain, fatigue, and depression), functional status, general health perception, and characteristic of the environment (social

support) significantly explain the variance in quality of life for older adults with medically diagnosed OA who are scheduled for TKR surgery?

The statistical analysis for this question was similar to that for question two. Data were checked for linearity, multicollinearity, homoscedasticity, outliers, and normality. Characteristics of the individual (age, sex, race, and expectations) were entered into the multiple regression in the first block. The other seven predictor variables were entered simultaneously into the multiple regression model second block. This analysis determined the specific amount of variance in overall quality of life explained by the variables beyond that explained by characteristics of the individual. Statistical significance for each variable and the overall model was set at alpha less than or equal to 0.05.

Q7. When controlling for characteristic of the environment (social support), do biological function (BMI), symptoms (pain, fatigue, and depression), functional status, general health perception, and characteristics of the individual (age, sex, race, and expectations) significantly explain the variance in quality of life for older adults with medically diagnosed OA who are scheduled for TKR surgery?

The statistical analysis for this question was also similar to that of question two. Data were checked for linearity, multicollinearity, homoscedasticity, outliers, and normality. Characteristic of the environment (social support) was entered as the first block of the multiple regression model. The other 10 predictor variables were entered simultaneously into the second block of the model. This analysis determined the specific amount of variance in overall quality of life explained by the variables beyond that

explained by characteristic of the environment. Statistical significance for each variable and the overall model was set at alpha less than or equal to 0.05.

Q8. When controlling for characteristics of the individual (age, sex, race, and expectations) and characteristic of the environment (social support), do biological function (BMI), symptoms (pain, fatigue, and depression), functional status, and general health perception significantly explain the variance in quality of life for older adults with medically diagnosed OA who are scheduled for TKR surgery?

The statistical analysis for this question was similar to that of question two. Data were checked for linearity, multicollinearity, homoscedasticity, outliers, and normality. Characteristics of the individual and characteristic of the environment were entered into the multiple regression model as the first block. All other six predictor variables were entered into the second block. This analysis determined the specific amount of variance in overall quality of life that was explained by the variables beyond that explained by the characteristics of the individual and characteristic of the environment. Statistical significance for each variable and the overall model was set at alpha less than or equal to 0.05.

Limitations

Several limitations to the cross-sectional design need recognition. There was no control group for comparison creating threats to internal validity. The use of a convenience sample rather than random sampling limited the generalizability of the

findings. Also, the cross-sectional design isolated the participant's evaluation of their quality of life to one point in time. This may have been misrepresentative of the actual nature of quality of life for older adults. Quality of life is not a static phenomena but rather dynamic depending on the individual's experiences and expectations. Finally, the current literature lacks comparative normative data for individual expectations.

Summary

A cross-sectional, correlational non-experimental study was conducted to determine factors that influence quality of life in older adults with medically diagnosed OA and who are planning TKR surgery. A targeted convenience sample of 75 individuals who are scheduled for first time TKR surgery was used. The revised Wilson and Cleary model of health-related quality of life (Ferrans et al., 2005) guided this study. Six instruments were administered by the PI to participants who met the inclusion criteria and agreed to participate. Data analyses included descriptive statistics and regression modeling to determine the influence of 11 predictor variables on quality of life.

CHAPTER IV

RESULTS

This chapter includes the results of the statistical analyses for the study. This detailed description will include the final sample size along with an examination of the outcomes of instrument testing, the study data, and a specific analysis of each research question. Additionally, several different models were explored based on the initial findings.

Sample

Participants were recruited from three large orthopedic offices and four hospital or clinic based pre-operative joint replacement classes in central North Carolina. Potential participants were provided with information regarding the study either by telephone, study flyers, or in person by the pre-operative class instructors. Of the 87 persons contacted by the principal investigator (PI), twelve did not participate due to: (a) cancelation of appointment due to illness or they no longer wanted to participate ($n = 5$), (b) ineligibility because they were not native born to the United States ($n = 3$), (c) contacting the PI after their total knee replacement (TKR) surgery ($n = 3$), and (d) previous diagnosis of cognitive impairment ($n = 1$). Data collection was conducted by the PI and completed in one session lasting approximately 45-60 minutes per person. All but five of the participants completed the interview at their private residence. The other

interviews were completed at a location selected by the participant such as a library or place of employment. A total of 75 persons completed the study.

Preliminary Examination of Data

All data were entered into SPSS version 18.0 (SPSS, Inc., Chicago, IL). Five instruments required scores to be calculated. Using the formulas provided by the instrument's authors, these scores were computed using the SPSS statistical software. Ferrans' syntax for the Quality of Life Index-Arthritis Version III (QLI-A) was used to score the four subscales and total QLI-A. Cronbach's alpha was calculated for each instrument to check for internal reliability. Scores were acceptable (Cronbach, 1990) and ranged from 0.743-0.934 (see Table 1).

Table 1. Internal Reliability of Instruments

| Instrument | Cronbach's Alpha |
|--|---------------------|
| Hospital for Special Surgery Knee Replacement Expectations Survey | 0.829 |
| Medical Outcome Study Social Support Survey | 0.934 |
| Western Ontario and McMaster Universities Osteoarthritis Index© -Function Subscale | 0.905 |
| Geriatric Depression Scale Short Form | 0.743 |
| Quality of Life Index-Arthritis Version III | 0.907 |

Item 23 of the QLI-A was to be answered by participants who were currently employed. Of the participants in the sample, 76% ($n = 57$) reported being retired or unemployed. Due to this low number of responses for this item (only 24%), the Cronbach's alpha could not be calculated with item 23 included. Therefore, the Cronbach's alpha was calculated without item 23.

All data points were checked against the data collection forms for accuracy prior to data analyses. No extreme values were noted, and all data were verified to have been entered correctly. Frequencies were run on all variables to visually check for missing data and extreme values. There were only two missing data points: (a) income level, and (b) item 3 on the Geriatric Depression Scale Short Form (GDS-SF). In both cases, the participant declined to answer the question.

The data were tested for normality by examining both the skewness and kurtosis statistics for each continuous variable. If the skewness and kurtosis values were between -1 and +1, the variables were considered normally distributed. Six variables did not fall within this range: (a) expectations, (b) body mass index (BMI), (c) depression, (d) quality of life, (e) general health perception, and (f) social support. The variables depression and BMI were positively skewed, and a square root transformation was applied. A reflection and logarithm transformation was applied to the variable BMI to evaluate improvements beyond the square root transformation. The skewness and kurtosis for BMI worsened with a reflection and logarithm transformation (-3.452 and 14.361, respectfully). Therefore, the decision was made to accept the square root transformation. The variables expectations, current health perception, and social support were negatively skewed

requiring transformation by reflecting and then calculating the square root. The quality of life variable was substantially negatively skewed and required reflection and logarithm transformation. The skewness and kurtosis of all of the variables were significantly improved as a result of the transformation (see Table 2).

Table 2. The Effect of Data Transformation on Skewness and Kurtosis

| Variable | Pre-transformation | | Post-transformation | |
|------------------------------|--------------------|----------|---------------------|----------|
| | Skewness | Kurtosis | Skewness | Kurtosis |
| Expectations* | -1.130 | 1.398 | 0.293 | -0.058 |
| BMI ⁺ | 1.170 | 1.155 | 0.926 | 0.482 |
| Depression ⁺ | 1.888 | 5.107 | -0.118 | 0.468 |
| Quality of Life [#] | -1.143 | 2.273 | 0.298 | -0.037 |
| General Health Perception* | -1.174 | 1.471 | 0.528 | -0.014 |
| Social Support* | -1.072 | 1.061 | 0.117 | -0.557 |

⁺ Square root transformation

* Reflect and square root transformation

[#] Reflect and logarithm transformation

Each continuous independent variable was graphed with quality of life, the dependent variable, in scatterplots. This graphical presentation allowed for visual examination to identify outliers and to check the linearity of the data. Two outliers were noted. Therefore, three additional regression analyses were performed to examine the results of each research question: (a) without case #1, (b) without case #2, and (c) without case #1 and #2, and comparisons were made to the analyses including all participants.

Sample Demographics

The sample consisted of 75 adults with osteoarthritis (OA) of the knee planning first time TKR surgery. The ages of the sample ranged from 52 to 86 years old, with a mean age of 69 years ($SD = 8.179$). The majority of the sample were female (76%), White (67%), and married (73%). Among the participants, over half of the sample (64%) reported their current employment status as retired, and approximately one-third (34%) reported an annual household income greater than \$71,000 (see Table 3).

Table 3. Demographic Statistics (N=75)

| Variable | N | (%)* |
|--------------------------------|----|------|
| Sex | | |
| Female | 57 | (76) |
| Male | 18 | (24) |
| Race | | |
| White | 65 | (87) |
| Black | 10 | (13) |
| Marital Status | | |
| Married | 55 | (73) |
| Single | 3 | (4) |
| Divorced | 6 | (8) |
| Widow | 11 | (15) |
| Employment Status | | |
| Employed | 18 | (24) |
| Retired | 48 | (64) |
| Unemployed/Disabled | 9 | (12) |
| Annual Household Income (N=74) | | |
| \$0-\$10,999 | 4 | (5) |
| \$11,000-\$20,999 | 6 | (8) |
| \$21,000-\$30,999 | 9 | (12) |
| \$31,000-\$40,999 | 12 | (16) |
| \$41,000-\$50,999 | 7 | (9) |
| \$51,000-\$60,999 | 4 | (5) |
| \$61,000-\$70,999 | 7 | (9) |
| \$71,000+ | 25 | (34) |
| Declined to answer | 1 | (2) |

*percentages rounded

Health-Related Quality of Life Model Variables

The model consisted of the following variables: (a) characteristics of the individual, (b) characteristic of the environment, (c) biological function, (d) symptoms, (e) functional status, (f) general health perception, and (g) overall quality of life. The resulting descriptive statistics for each of health-related quality of life model variables are listed in Table 4.

Table 4. Health-Related Quality of Life Model Variables (N=75)

| Variable | Mean | SD | Range | Possible Range |
|--|-------|-------|---------------|----------------|
| Characteristics of the Individual | | | | |
| Expectations | 76.21 | 12.47 | 38.16 - 94.74 | 0 - 100 |
| Characteristic of the Environment | | | | |
| Social Support Overall* | 80.81 | 16.26 | 25 - 100 | 0 - 100 |
| Emotional/Informational | 4.03 | 0.75 | 2.13 - 5.00 | 1 - 5 |
| Tangible | 4.46 | 0.67 | 2.25 - 5.00 | 1 - 5 |
| Affectionate | 4.54 | 0.81 | 1.67 - 5.00 | 1 - 5 |
| Positive Social Interaction | 4.23 | 0.98 | 1.00 - 5.00 | 1 - 5 |
| Biological Function | | | | |
| BMI | 32.61 | 7.23 | 23.41 - 54.94 | - |
| Symptom | | | | |
| Pain | 5.15 | 2.38 | 0 - 10 | 0 - 10 |
| Fatigue | 5.17 | 2.48 | 0 - 10 | 0 - 10 |
| Depression | 2.43 | 2.16 | 0 - 12 | 0 - 15 |
| WOMAC | | | | |
| Pain | 10.1 | 3.24 | 3 - 18 | 0 - 20 |
| Stiffness | 4.71 | 1.69 | 0 - 8 | 0 - 8 |
| Functional Status | 32.4 | 10.89 | 3 - 55 | 0 - 68 |
| General Health Perception | 7.04 | 2.18 | 0 - 10 | 0 - 10 |
| Quality of Life-Overall | | | | |
| Health and functioning | 20.81 | 4.61 | 4.57 - 27.63 | 0 - 30 |
| Socioeconomic | 24.87 | 3.41 | 11.07 - 30.00 | 0 - 30 |
| Psychological/spiritual | 24.58 | 4.16 | 8.14 - 30.00 | 0 - 30 |
| Family | 25.69 | 4.13 | 13.50 - 30.00 | 0 - 30 |

* Social Support Index: one additional question is not part of the subscale calculations

Research Question #1

What are the expectations of older adults with medically diagnosed osteoarthritis (OA) who are scheduled for TKR surgery?

The mean expectation score was 76.21 ($SD = 12.47$) out of a possible score of 100. A higher score on the Hospital for Special Surgery Knee Replacement Expectations survey indicates higher expectations. The scores ranged from 38-94. Expectation scores varied slightly between males and females, Blacks and Whites, age groups (see Table 5).

Simple correlations were conducted to evaluate the relationship between all continuous variables in the study (see Table 6). The expectation score was not significantly correlated with any of the other study variables.

*Table 5. Characteristics of the Individual: Expectation Scores by Sex, Race and Age
(N = 75)*

| | M | SD | Range |
|---------------|-------|-------|---------------|
| Sex | | | |
| Female | 75.46 | 13.11 | 38.16 - 92.11 |
| 25 percentile | 67.76 | - | - |
| 50 percentile | 78.95 | - | - |
| 75 percentile | 84.21 | - | - |
| Male | 78.58 | 10.10 | 59.21 - 94.74 |
| 25 percentile | 70.72 | - | - |
| 50 percentile | 78.95 | - | - |
| 75 percentile | 88.49 | - | - |
| Race | | | |
| White | 76.34 | 12.73 | 38.16 - 94.74 |
| 25 percentile | 68.42 | - | - |
| 50 percentile | 78.95 | - | - |
| 75 percentile | 84.21 | - | - |
| Black | 75.40 | 11.20 | 59.12 - 92.11 |
| 25 percentile | 67.11 | - | - |
| 50 percentile | 72.37 | - | - |
| 75 percentile | 89.47 | - | - |
| Age | | | |
| 50 – 64 years | 76.82 | 13.66 | 38.16 - 92.11 |
| 65 – 79 years | 77.11 | 11.21 | 38.16 - 94.74 |
| 80+ years | 70.47 | 14.14 | 42.11 - 81.58 |

Table 6. Intercorrelations of Continuous Variables (N=75)

| Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|-----------------|---|-------|------|-------------|-----------|------------|-------------|------------|-------------|-------------|
| 1. Expectations | - | -.176 | .199 | .007 | .055 | -.047 | -.084 | -.077 | .160 | .074 |
| 2. Age | | - | .091 | -.335 ** | .002 | .159 | -.173 | -.231 * | -.102 | .229 * |
| 3. SSI | | | - | -.217 | - .038 | -.123 | -.422 ** | -.006 | .239 * | .553 ** |
| 4. BMI | | | | - | .045 | .024 | .242 * | .077 | -.005 | -.299 ** |
| 5. Pain | | | | | - | .420 ** | .231 * | .501 ** | .001 | -.092 |
| 6. Fatigue | | | | | | - | .362 ** | .455 ** | -.041 | -.267 * |
| 7. Depression | | | | | | | - | .427 ** | -.324 ** | -.690 ** |
| 8. WOMAC-F | | | | | | | | - | .063 | -.330 ** |
| 9. GHP | | | | | | | | | - | .377 ** |
| 10. QLI-A | | | | | | | | | | - |

SSI = Social Support Index
 BMI = Body Mass Index
 WOMAC-F = WOMAC Function subscale
 GHP = General Health
 QLI-A = Quality of Life Index-Arthritis

* $p \leq .05$

** $p < .01$

Research Question #2

Do characteristics of the individual (age, sex, and race) significantly explain the variance in expectations of the older adults with medically diagnosed OA who are scheduled for TKR surgery?

Multiple regression analysis was used to determine the influence of characteristics of the individual, as described in the revised Wilson and Cleary model (Ferrans et al., 2005), on the expectations of older adults with OA. This analysis includes two nominal variables (sex and race) which required dummy coding prior to entering into the model. For the variable race only two responses were chosen by the participants (White and Black). The dummy codes are listed in Table 7.

Table 7. Dummy Codes for Nominal Variables

| | Reference Value = 1 | Non-reference Value =0 |
|------|---------------------|------------------------|
| Sex | Female | Male |
| Race | White | Black |

Prior to examining the regression model statistics, the data were inspected for potential outliers that may affect the analysis and assumptions of multiple regression. The data were first examined for issues related to multicollinearity. All of the variance inflation factors were less than 10.0 and the tolerance values were greater than 0.10, indicating no concerns for multicollinearity (Tabachnick & Fidell, 2007). Additionally,

bivariate correlations did not reveal strong positive or negative correlations between the study variables. All correlations were less than the acceptable limit of 0.85. All standardized residual values were between the acceptable values of -3.0 and 3.0 (Tabachnick & Fidell, 2007); thus, indicating no issues with outliers.

The assumptions of multiple regression (normality, linearity, and homoscedasticity) were checked. Scatterplots of the predicted values and residuals were examined. The points were equally distributed around the midpoint, with no concerning patterns noted (Tabachnick & Fidell, 2007). Thus, all multiple regression assumptions were successfully satisfied.

In response to research question number two, the three characteristics of the individual (age, sex, and race) were entered into the regression analysis together in one block. This model was not significant in explaining the variance in expectations of older adults with OA (see Table 8).

Table 8. Multiple Regression Summary for Characteristics of the Individual (N = 75)

| | Standardized Regression Coefficient | <i>t</i> | <i>p</i> |
|--|---|----------|----------|
| Age | 0.208 | 1.786 | 0.078 |
| Sex Female | 0.114 | 0.987 | 0.327 |
| Race White | -0.052 | -0.447 | 0.656 |
| $R^2 = 0.056$ $R^2_{adj} = 0.016$ $F = 1.404$ $p = 0.249$ | | | |

Research Question #3

Do expectations significantly explain the variance in quality of life for older adults with medically diagnosed OA who are scheduled for TKR surgery?

Expectations were entered into the first block. The output was first examined to ensure regression assumptions were met and that there were no problems which may affect confidence in the findings. Bivariate correlations were noted to be less than 0.85, variance inflation factors were all less than 10, and all tolerance values were greater than 0.10. Thus, no problems were noted with multicollinearity. A scatterplot of predicted and residual values demonstrated that the regression assumptions were met. Standardized residual values indicated no problems with multivariate outliers. This model did not significantly explain the variance in quality of life for older adults with OA ($R^2 = .003$, $R^2_{\text{adj}} = -.011$), $F(1,73) = .201$, $p = 0.656$ (see Table 9).

Table 9. Simple Regression Summary for Expectations Variable on Overall Quality of Life (N=75)

| | Standardized Regression Coefficient | <i>t</i> | <i>P</i> |
|--|---|----------|----------|
| Expectation Score (square root) | 0.052 | 0.448 | 0.656 |
| $R^2 = 0.003$ $R^2_{\text{adj}} = -0.011$ $F = 0.201$ $p = 0.656$ | | | |

Research Question #4

When controlling for expectations, do biological function (BMI), symptom (pain, fatigue, and depression), functional status, general health perception, characteristics of the individual (age, sex, and race), and characteristic of the environment (social support) explain the variance in quality of life for older adults with medically diagnosed OA who are scheduled for TKR surgery?

Sequential regression was used to determine if the explanation of variance in overall quality of life is improved with the addition of health-related variables to the model after characteristics of the individual (expectations) are already taken into consideration. Characteristics of the individual (expectations) were entered into the first block of the multiple regression model, and the other variables were entered together in the second block. There were no multivariate outliers or problems with homoscedasticity. All multiple regression assumptions were met as noted by residual scatterplots.

Characteristics of the individual (expectations) did not significantly contribute to the overall quality of life $F(1,73) = .201, p = .656$. Although after controlling for characteristic of the individual (expectations), the second model significantly explained 62 % ($R^2 = 0.621, R^2_{\text{adj}} = .554$) of the variance in overall quality of life $F(11, 63) = 10.264, p < 0.001$. Social support, depression, functional status, and general health perception were the significant variables in this model (see Table 10).

Table 10. Multiple Regression Summary Controlling for Characteristic of the Individual: Expectations (N=75)

| Model | | Standardized Regression Coefficient | <i>t</i> | <i>p</i> |
|-------|---|-------------------------------------|----------|----------|
| 1 | Expectations | 0.052 | 0.448 | 0.656 |
| 2 | Expectations | -0.106 | -1.245 | 0.218 |
| | Social Support | 0.399 | 4.106 | 0.000* |
| | Age | -0.075 | -0.796 | 0.429 |
| | Sex Female | -0.056 | -0.632 | 0.530 |
| | Race White | 0.070 | 0.818 | 0.416 |
| | BMI | 0.119 | 1.376 | 0.174 |
| | Pain | -0.132 | -1.336 | 0.186 |
| | Fatigue | 0.053 | 0.534 | 0.595 |
| | Depression | 0.313 | 3.157 | 0.002* |
| | Functional Status | 0.263 | 2.335 | 0.023* |
| | GHP | 0.236 | 2.763 | 0.007* |
| 1 | $R^2 = 0.003$ $R^2_{adj} = -0.011$ $F = 0.201$ $p = 0.656$ | | | |
| 2 | $R^2 = 0.618$ $R^2_{adj} = 0.554$ $F = 10.264$ $p < 0.001$ $*p \leq 0.05$ | | | |

Research Question #5

Do biological function (BMI), symptoms (pain, fatigue, depression), functional status, general health perception, characteristics of the individual (age, sex, race, and expectations), and characteristic of the environment (social support) significantly explain

the variance in quality of life for older adults with medically diagnosed OA who are scheduled for TKR surgery?

Initially, the regression output was examined for problems or failure to meet the multiple regression assumptions which may result in a lack of confidence in the findings. All regression assumptions for multicollinearity were met. Bivariate correlations were acceptable at a value less than 0.85, variance inflation factors were all less than 10, and tolerance values were all greater than 0.10. There were no multivariate outliers upon review of the standardized residual values. Further analysis of the scatterplots of residual and predicted values supported that the assumptions for multiple regression had been met.

All 11 independent variables were entered simultaneously into one block. This regression model significantly explained 62% ($R^2 = 0.621$, $R^2_{adj} = 0.554$) of the variance in overall quality of life, $F(11, 63) = 9.372$, $p < 0.001$. The variables which were significant in the model were depression, functional status, general health perception, and social support (see Table 11).

Table 11. Multiple Regression Summary for Variables on Overall Quality of Life (N=75)

| | Standardized Regression Coefficient | <i>t</i> | <i>p</i> |
|--|---|----------|----------|
| Expectations | -0.106 | -1.245 | 0.218 |
| Social Support | 0.399 | 4.106 | 0.000* |
| Age | -0.075 | -0.796 | 0.429 |
| Sex Female | -0.056 | -0.632 | 0.530 |
| Race White | 0.070 | 0.818 | 0.416 |
| BMI | 0.119 | 1.376 | 0.174 |
| Pain | -0.132 | -1.336 | 0.186 |
| Fatigue | 0.053 | 0.534 | 0.595 |
| Depression | 0.313 | 3.157 | 0.002* |
| Functional Status | 0.263 | 2.335 | 0.023* |
| GHP | 0.236 | 2.763 | 0.007* |
| <hr/> $R^2 = 0.621$ $R^2_{adj} = 0.554$ $F = 9.372$ $p < 0.001$ $*p \leq 0.05$ <hr/> | | | |

Research Question #6

When controlling for characteristics of the individual (age, sex, race, and expectations), do biological function (BMI), symptoms (pain, fatigue, and depression), functional status, general health perception, and characteristic of the environment (social support) significantly explain the variance in quality of life for older adults with medically diagnosed OA who are scheduled for TKR surgery?

Sequential regression was again used to determine if the explanation of variance in overall quality of life is improved with the addition of health-related variables to the model after characteristics of the individual (age, sex, race, and expectations) are already taken into consideration. Characteristics of the individual (age, sex, race, and expectations) were entered into the first block of the multiple regression model and the remaining seven variables were entered together in the second block. All multiple regression assumptions were met as noted by residual scatterplots. There were no multivariate outliers or problems with homoscedasticity.

Characteristics of the individual did not significantly contribute to overall quality of life in this regression model $F(4, 70) = 1.932, p = 0.115$. After controlling for characteristics of the individual (age, sex, race, and expectations), model two significantly accounted for 52% ($R^2 = 0.521, R^2_{adj} = 0.554$) of the variance in overall quality of life $F(11, 63) = 9.372, p < 0.001$. The significant variables were depression, functional status, general health perception, and social support (see Table 12).

Table 12. Multiple Regression Summary Controlling for All Characteristics of the Individual (N=75)

| Model | | Standardized Regression Coefficient | <i>t</i> | <i>p</i> |
|-------|---|---|----------|----------|
| 1 | Age | -0.271 | -2.317 | 0.023 |
| | Sex Female | 0.156 | 1.369 | 0.176 |
| | Race White | 0.077 | 0.673 | 0.503 |
| | Expectations | 0.091 | 0.779 | 0.439 |
| 2 | Age | -0.075 | -0.796 | 0.429 |
| | Sex Female | -0.056 | -0.632 | 0.530 |
| | Race White | 0.070 | 0.818 | 0.416 |
| | Expectations | -0.106 | -1.245 | 0.218 |
| | Social Support | 0.399 | 4.106 | 0.000* |
| | BMI | 0.119 | 1.376 | 0.174 |
| | Pain | -0.132 | -1.336 | 0.186 |
| | Fatigue | 0.053 | 0.534 | 0.595 |
| | Depression | 0.313 | 3.157 | 0.002* |
| | Functional Status | 0.263 | 2.335 | 0.023* |
| | GHP | 0.236 | 2.763 | 0.007* |
| 1 | $R^2 = 0.099$ $R^2_{adj} = 0.048$ $F = 1.932$ $p = 0.115$ | | | |
| 2 | $R^2 = 0.521$ $R^2_{adj} = 0.554$ $F = 9.372$ $p < 0.001$ * $p \leq 0.05$ | | | |

Research Question #7

When controlling for characteristic of the environment (social support), do biological function (BMI), symptoms (pain, fatigue, and depression), functional status, general health perception, and characteristics of the individual (age, sex, race, and expectations) significantly explain the variance in quality of life for older adults with medically diagnosed OA who are scheduled for TKR surgery?

Sequential regression was used to determine if the explanation of variance in overall quality of life is improved with the addition of health-related variables to the model after characteristic of the environment (social support) is already taken into consideration. Characteristic of the environment was entered into the first block of the multiple regression model and the remaining 10 variables were entered simultaneously in the second block. Evaluation of the output did not reveal multivariate outliers or problems with homoscedasticity. All multiple regression assumptions were met as noted by residual scatterplots.

Characteristic of the environment did significantly contribute to overall quality of life in this regression model accounting for 28% ($R^2 = 0.283$, $R^2_{adj} = 0.273$) of the overall variance in quality of life $F(1, 73) = 28.748$, $p < 0.001$. After controlling for characteristic of the environment (social support), model two also significantly accounted for 34% ($R^2 = 0.338$, $R^2_{adj} = 0.554$) of the variance in overall quality of life $F(11, 63) = 9.372$, $p < 0.001$. The significant variables were depression, functional status, and general health perception (see Table 13).

Table 13. Multiple Regression Summary Controlling for Characteristic of the Environment (N=75)

| Model | | Standardized Regression Coefficient | <i>t</i> | <i>p</i> |
|-------|---|-------------------------------------|----------|----------|
| 1 | Social Support | 0.532 | 5.362 | 0.000* |
| 2 | Social Support | 0.399 | 4.106 | 0.000* |
| | Age | -0.075 | -0.796 | 0.429 |
| | Sex Female | -0.056 | -0.632 | 0.530 |
| | Race White | 0.070 | 0.818 | 0.416 |
| | Expectations | -0.106 | -1.245 | 0.218 |
| | BMI | 0.119 | 1.376 | 0.174 |
| | Pain | -0.132 | -1.336 | 0.186 |
| | Fatigue | 0.053 | 0.534 | 0.595 |
| | Depression | 0.313 | 3.157 | 0.002* |
| | Functional Status | 0.263 | 2.335 | 0.023* |
| | GHP | 0.236 | 2.763 | 0.007* |
| 1 | $R^2 = 0.283$ $R^2_{adj} = 0.273$ $F = 28.748$ $p < 0.001$ | | | |
| 2 | $R^2 = 0.338$ $R^2_{adj} = 0.554$ $F = 9.372$ $p < 0.001$ $* p \leq 0.05$ | | | |

Research Question #8

When controlling for characteristics of the individual (age, sex, race, and expectations) and characteristic of the environment (social support), do biological function (BMI), symptoms (pain, fatigue, and depression), functional status, general

health perception, and characteristic of the environment (social support) significantly explain the variance in quality of life for older adults with medically diagnosed OA who are scheduled for TKR surgery?

Sequential regression was again used to determine if the explanation of variance in overall quality of life is improved with the addition of health-related variables to the model after characteristics of the individual (age, sex, race, and expectations) and characteristic of the environment (social support) are already taken into consideration. Characteristics of the individual and environment were entered into the first block of the multiple regression model and the remaining six variables were entered together in the second block. Evaluation of the regression output did not reveal multivariate outliers or problems with homoscedasticity. Residual scatterplots were assessed and all multiple regression assumptions were met.

Characteristics of the individual and environment did significantly contribute to overall quality of life in this regression model accounting for 33% ($R^2 = 0.326$, $R^2_{\text{adj}} = 0.277$) of the overall variance in quality of life $F(5, 69) = 6.684$, $p < 0.001$. The only significant variable was social support. After controlling for characteristics of the individual (age, sex, race, and expectations) and characteristic of the environment (social support), model two also significantly accounted for 29% ($R^2 = 0.294$, $R^2_{\text{adj}} = 0.554$) of the variance in overall quality of life $F(11, 63) = 9.372$, $p < 0.001$. The significant variables were again depression, functional status, and general health perception (see Table 14).

Table 14. Multiple Regression Summary Controlling for Individual and Environment (N=75)

| Model | | Standardized Regression Coefficient | <i>t</i> | <i>p</i> |
|-------|---|-------------------------------------|----------|----------|
| 1 | Age | -0.195 | -1.890 | 0.063 |
| | Sex Female | -0.016 | -0.150 | 0.881 |
| | Race White | 0.047 | 0.465 | 0.643 |
| | Expectations | -0.045 | -0.423 | 0.674 |
| | Social Support | 0.531 | 4.820 | 0.000* |
| 2 | Age | -0.075 | -0.796 | 0.429 |
| | Sex Female | -0.056 | -0.632 | 0.530 |
| | Race White | 0.070 | 0.818 | 0.416 |
| | Expectations | -0.106 | -1.245 | 0.218 |
| | Social Support | 0.399 | 4.106 | 0.000* |
| | BMI | 0.119 | 1.376 | 0.174 |
| | Pain | -0.132 | -1.336 | 0.186 |
| | Fatigue | 0.053 | 0.534 | 0.595 |
| | Depression | 0.313 | 3.157 | 0.002* |
| | Functional Status | 0.263 | 2.335 | 0.023* |
| | GHP | 0.236 | 2.763 | 0.007* |
| 1 | $R^2 = 0.326$ $R^2_{adj} = 0.277$ $F = 6.684$ $p < 0.001$ | | | |
| 2 | $R^2 = 0.294$ $R^2_{adj} = 0.554$ $F = 9.372$ $p < 0.001$ * $p \leq 0.05$ | | | |

Additional Analyses

To examine the relationship of life satisfaction and quality of life in this population to compare with previous research, a Pearson correlation was conducted. A moderately positive correlation was found between life satisfaction scores and overall quality of life score ($r = 0.395, p < 0.001$).

Following the examination of the results, additional analyses were performed. The first analyses were done to remove the two outlier cases on the QLI-A. All regression models were recalculated. Second, an analysis was conducted to examine the influence of the total model on each of the four quality of life subscales. The third analyses explored the influence of the social support subscales on overall quality of life. Fourth, all non-significant independent variables in the initial regression model on quality of life were re-examined in a regression model. Fifth, a regression analysis was conducted to examine the impact of the significant bivariate correlates of the QLI-A on quality of life. Finally, further regression analyses were performed to more clearly evaluate symptoms and functional status separate from the other factors in the model.

Additional Analysis #1: Regressions Repeated without Outlier Cases (N=73)

Examination of scatterplots of the various independent variables on the QLI-A identified two cases as consistent outliers due to low scores on the QLI-A. In borderline case #1, the participant scored 9.15 on the QLI-A; and in borderline case #2, the participant scored 13.85. The mean QLI-A score was 23.14 ($SD = 3.58$). The next highest score was 14.85.

Without Borderline Case #1

Analysis was run without the outlier case. The final model with all 11 variables included in one block accounted for 57% ($R^2 = 0.574$, $R^2_{\text{adj}} = 0.498$) of the variance in overall quality of life, $F(11, 62) = 7.596$, $p < 0.001$. Significant variables were consistent with the original model analysis with all cases included: depression, functional status, social support, and general health perception (see Table 15).

Table 15. Multiple Regression Summary without Borderline Case #1 (N = 74)

| Model | Standardized Regression Coefficient | <i>t</i> | <i>p</i> |
|---|-------------------------------------|----------|----------|
| Age | -0.076 | -0.752 | 0.455 |
| Sex Female | -0.061 | -0.651 | 0.517 |
| Race White | 0.069 | 0.750 | 0.456 |
| Pain | -0.141 | -1.334 | 0.187 |
| Fatigue | 0.054 | 0.510 | 0.612 |
| Functional Status | 0.281 | 2.342 | 0.022* |
| BMI | 0.119 | 1.301 | 0.198 |
| Expectations | -0.117 | -1.290 | 0.202 |
| General Health Perception | 0.222 | 2.480 | 0.016* |
| Depression | 0.300 | 2.930 | 0.005* |
| Social Support | 0.417 | 4.093 | 0.000* |
| $R^2 = 0.574$ $R^2_{adj} = 0.498$ $F = 7.596$ $p < 0.001$ * $p \leq 0.05$ | | | |

Without Borderline Case #2

Regression analysis was re-examined without the second outlier case. The final model with all 11 variables included in one block accounted for 59% ($R^2 = 0.594$, $R^2_{adj} = 0.522$) of the variance in overall quality of life $F(11, 62) = 8.252$, $p < 0.001$. Significant

variables continued to be depression, functional status, social support, and general health perception (see Table 16).

Table 16. Multiple Regression Summary without Borderline Case #2 (N = 74)

| Model | Standardized Regression Coefficient | <i>t</i> | <i>p</i> |
|---|-------------------------------------|----------|----------|
| Age | -0.079 | -0.800 | 0.427 |
| Sex Female | -0.056 | -0.606 | 0.547 |
| Race White | 0.073 | 0.817 | 0.417 |
| Pain | -0.134 | -1.288 | 0.203 |
| Fatigue | 0.053 | 0.520 | 0.605 |
| Functional Status | 0.268 | 2.281 | 0.026* |
| BMI | 0.125 | 1.376 | 0.174 |
| Expectations | -0.106 | -1.182 | 0.242 |
| General Health Perception | 0.246 | 2.744 | 0.008* |
| Depression | 0.310 | 3.070 | 0.003* |
| Social Support | 0.390 | 3.781 | 0.000* |
| $R^2 = 0.594$ $R^2_{adj} = 0.522$ $F = 8.252$ $p < 0.001$ * $p \leq 0.05$ | | | |

Without Borderline Cases #1 and #2

Regression analysis without both borderline cases was conducted. The final model with all 11 variables included in one block accounted for 54% ($R^2 = 0.539$, $R^2_{\text{adj}} = 0.456$) of the variance in overall quality of life $F(11, 61) = 6.480$, $p < 0.001$. Significant variables continued to be depression, functional status, social support, and general health perception (see Table 17).

Table 17. Multiple Regression Summary without Borderline Cases # 1 & 2 (N = 73)

| Model | Standardized Regression Coefficient | <i>t</i> | <i>p</i> |
|---|-------------------------------------|----------|----------|
| Age | -0.080 | -0.761 | 0.450 |
| Sex Female | -0.061 | -0.618 | 0.539 |
| Race White | 0.072 | -0.750 | 0.456 |
| Pain | -0.143 | -1.275 | 0.207 |
| Fatigue | 0.054 | 0.491 | 0.625 |
| Functional Status | 0.286 | 2.281 | 0.026* |
| BMI | 0.127 | 1.311 | 0.195 |
| Expectations | -0.117 | -1.217 | 0.228 |
| General Health Perception | 0.233 | 2.472 | 0.016* |
| Depression | 0.296 | 2.825 | 0.006* |
| Social Support | 0.406 | 3.743 | 0.000* |
| $R^2 = 0.539$ $R^2_{adj} = 0.456$ $F = 6.480$ $p < 0.001$ * $p \leq 0.05$ | | | |

Multiple regression equations may be sensitive to outliers. Therefore, all multiple regression models were reexamined without the two outlier cases (N = 73). All analyses were conducted in the same manner as previously described with all assumptions for

multiple regression being met. The results were very similar to those of the regression models including all cases ($N = 75$) (see Table 18).

Table 18. Comparison of Regression Results With ($N = 75$) and Without ($N = 73$) Borderline Cases

| Model | R^2 | R^2_{adj} | F | p |
|---------|-------|-------------|-------|---------|
| 1 | | | | |
| With | 0.056 | 0.016 | 1.404 | 0.249 |
| Without | 0.059 | 0.018 | 1.449 | 0.236 |
| 2 | | | | |
| With | 0.003 | -0.011 | 0.201 | 0.656 |
| Without | 0.001 | -0.013 | 0.077 | 0.782 |
| 3 | | | | |
| With | | | | |
| Block 1 | 0.003 | -0.011 | 0.201 | 0.656 |
| Block 2 | 0.618 | 0.554 | 9.372 | <0.001 |
| Without | | | | |
| Block 1 | 0.001 | -0.013 | 0.077 | 0.782 |
| Block 2 | 0.538 | 0.456 | 6.480 | <0.001 |
| 4 | | | | |
| With | 0.621 | 0.554 | 9.372 | <0.001 |
| Without | 0.539 | 0.456 | 6.480 | <0.001 |
| 5 | | | | |
| With | | | | |
| Block 1 | 0.099 | 0.048 | 1.932 | 0.115 |
| Block 2 | 0.521 | 0.554 | 9.372 | <0.001 |
| Without | | | | |
| Block 1 | 0.084 | 0.030 | 1.563 | 0.194 |
| Block 2 | 0.455 | 0.456 | 6.480 | < 0.001 |

Table 18 (Continued). Comparison of Regression Results With ($N = 75$) and Without ($N = 73$) Borderline Cases)

| Model | R^2 | R^2_{adj} | F | p |
|---------|-------|-------------|--------|--------|
| 6 | | | | |
| With | | | | |
| Block 1 | 0.283 | 0.273 | 28.748 | <0.001 |
| Block 2 | 0.338 | 0.554 | 9.372 | <0.001 |
| Without | | | | |
| Block 1 | 0.211 | 0.200 | 19.003 | <0.001 |
| Block 2 | 0.328 | 0.456 | 6.480 | <0.001 |
| 7 | | | | |
| With | | | | |
| Block 1 | 0.326 | 0.277 | 6.684 | <0.001 |
| Block 2 | 0.294 | 0.554 | 9.372 | <0.001 |
| Without | | | | |
| Block 1 | 0.258 | 0.202 | 4.650 | 0.001 |
| Block 2 | 0.281 | 0.456 | 4.650 | <0.001 |

Model 1 = Characteristics of the Individual on Expectations

Model 2 = Expectations on Overall Quality of Life

Model 3 = Controlling for Expectations

Model 4 = All variables on Overall Quality of Life

Model 5 = Controlling for Characteristics of the Individual

Model 6 = Controlling for Characteristic of the Environment

Model 7 = Controlling for Characteristics of the Individual and Environment

As noted in Table 18, the R^2 and R^2_{adj} minimally increased for the majority of regression models after omitting the borderline cases. Depression, functional status, general health perception, and social support were the significant contributing variables in all of the models with and without the borderline cases.

Additional Analysis #2: Regression Analyses on All Dimensions of Quality of Life

(N = 75)

Additional regression analysis were conducted to examine the total model's influence on each of the quality of life subscales (health and functioning, socioeconomic, psychological/spiritual, and family) in older adults with OA prior to TKR surgery. Each of the subscales were entered in separate regression models as the dependent variable. The 11 independent variables were entered together in one block. For each analysis, residual scatterplots were assessed to assure that the assumptions of multiple regression were met. There was no problem with multivariate outliers or homoscedasticity noted.

Regression Model #1: Health and Functioning Subscale

This model did not significantly explain the variance in the health and functioning dimension of overall quality of life ($R^2 = 0.033$, $R^2_{\text{adj}} = -0.136$), $F(11, 63) = 0.195$, $p = 0.997$ (see Table 19).

Table 19. Multiple Regression Summary for all Variables on Health and Functioning Subscale (N=75)

| Model | Standardized Regression Coefficient | <i>t</i> | <i>p</i> |
|---|-------------------------------------|----------|----------|
| Age | 0.035 | 0.234 | 0.816 |
| Sex Female | -0.008 | -0.059 | 0.953 |
| Race White | 0.040 | 0.292 | 0.771 |
| Pain | 0.174 | 1.102 | 0.275 |
| Fatigue | -0.155 | -0.979 | 0.332 |
| Functional Status | 0.009 | 0.048 | 0.962 |
| BMI | -0.050 | -0.364 | 0.717 |
| Expectations | 0.006 | 0.043 | 0.966 |
| GHP | -0.020 | -0.149 | 0.882 |
| Depression | 0.048 | 0.304 | 0.762 |
| Social Support | 0.031 | 0.201 | 0.841 |
| $R^2 = 0.033$ $R^2_{adj} = -0.136$ $F = 0.195$ $p = 0.997$ | | | |

Regression Model #2: Socioeconomic Subscale

This model did not significantly explain the variance in the socioeconomic dimension of overall quality of life ($R^2 = 0.165$, $R^2_{adj} = 0.019$), $F(11, 63) = 1.128$, $p = 0.355$ (see Table 20).

Table 20. Multiple Regression Summary for all Variables on Socioeconomic Subscale
(*N* = 75)

| Model | Standardized Regression Coefficient | <i>t</i> | <i>p</i> |
|---|-------------------------------------|----------|----------|
| Age | 0.128 | 0.919 | 0.361 |
| Sex Female | 0.140 | 1.070 | 0.289 |
| Race White | 0.081 | 0.525 | 0.525 |
| Pain | 0.162 | 1.101 | 0.275 |
| Fatigue | -0.151 | -1.030 | 0.307 |
| Functional Status | 0.132 | 0.788 | 0.434 |
| BMI | -0.229 | -1.787 | 0.079 |
| Expectations | -0.132 | -1.050 | 0.298 |
| General Health Perception | -0.019 | -0.152 | 0.880 |
| Depression | -0.091 | -0.615 | 0.541 |
| Social Support | 0.115 | 0.800 | 0.427 |
| $R^2 = 0.165$ $R^2_{adj} = .019$ $F = 1.128$ $p = 0.355$ | | | |

Regression Model #3: Psychological/Spiritual Subscale

This model also did not significantly explain the variance in the psychological/spiritual dimension of overall quality of life ($R^2 = 0.165$, $R^2_{adj} = 0.019$), $F(11, 63) = 1.128$, $p = 0.355$ (see Table 21).

Table 21. Multiple Regression Summary for all Variables on Psychological/Spiritual Subscale (N = 75)

| Model | Standardized Regression Coefficient | <i>t</i> | <i>p</i> |
|---|-------------------------------------|----------|----------|
| Age | 0.135 | 0.953 | 0.344 |
| Sex Female | 0.120 | 0.896 | 0.374 |
| Race White | 0.078 | 0.606 | 0.547 |
| Pain | 0.219 | 1.465 | 0.148 |
| Fatigue | -0.319 | -2.133 | 0.037 |
| Functional Status | 0.039 | 0.227 | 0.821 |
| BMI | -0.056 | -0.433 | 0.666 |
| Expectations | -0.178 | -1.391 | 0.169 |
| General Health Perception | -0.014 | -0.109 | 0.913 |
| Depression | 0.005 | 0.034 | 0.973 |
| Social Support | 0.124 | 0.848 | 0.400 |
| $R^2 = 0.135$ $R^2_{adj} = -0.015$ $F = 0.898$ $p = 0.548$ | | | |

Regression Model #4: Family Subscale

As noted by the non-significant *F*-score (11, 63) 0.146, $p = 0.355$, this model does not significantly explain the variance in the family dimension of overall quality of life ($R^2 = 0.025$, $R^2_{adj} = -0.145$) (see Table 22).

Table 22. Multiple Regression Summary for all Variables on Family Subscale (N = 75)

| Model | Standardized Regression Coefficient | <i>t</i> | <i>p</i> |
|---|-------------------------------------|----------|----------|
| Age | 0.119 | 0.788 | 0.434 |
| Sex Female | 0.014 | 0.098 | 0.933 |
| Race White | -0.003 | -0.024 | 0.981 |
| Pain | 0.021 | 0.131 | 0.896 |
| Fatigue | -0.131 | -0.823 | 0.414 |
| Functional Status | 0.043 | 0.239 | 0.812 |
| BMI | 0.089 | 0.643 | 0.523 |
| Expectations | -0.073 | -0.535 | 0.594 |
| General Health Perception | -0.016 | -0.118 | 0.907 |
| Depression | -0.027 | -0.171 | 0.865 |
| Social Support | 0.020 | 0.126 | 0.901 |
| $R^2 = 0.025$ $R^2_{adj} = -0.145$ $F = 0.146$ $p = 0.999$ | | | |

Additional Analysis #3: Social Support Subscales

A regression model was conducted to evaluate the influence of the social support variable on overall quality of life. Social support was significant in explaining 28% ($R^2 = 0.283$, $R^2_{adj} = 0.273$) of the variance in overall quality of life $F(1, 73) = 28.748$, $p < 0.001$. Further analyses were conducted with each of the four social support subscales in

place of the total social support score as the independent variable: (a) emotional, (b) tangible, (c) affectionate, and (d) positive support. The final model with all 14 variables included in one block accounted for 53% ($R^2 = 0.532$, $R^2_{\text{adj}} = 0.423$) of the variance in overall quality of life $F(14, 60) = 4.872$, $p < 0.001$. Significant variables were depression and general health perception (see Table 23).

Table 23. Multiple Regression Summary for all Variables Including Social Support Subscales on Quality of Life (N = 75)

| Model | Standardized Regression Coefficient | <i>t</i> | <i>p</i> |
|---|-------------------------------------|----------|----------|
| Social Support Emotional | -0.059 | -0.422 | 0.674 |
| Social Support Tangible | 0.019 | 0.162 | 0.872 |
| Social Support Affectionate | -0.098 | -0.776 | 0.441 |
| Social Support Positive | 0.174 | 1.035 | 0.305 |
| Age | -0.127 | -1.084 | 0.283 |
| Sex Female | 0.072 | 0.767 | 0.446 |
| Race White | 0.112 | 1.159 | 0.251 |
| Pain | -0.073 | -0.640 | 0.525 |
| Fatigue | 0.052 | 0.446 | 0.657 |
| Functional Status | 0.153 | 1.202 | 0.234 |
| BMI | 0.162 | 1.608 | 0.113 |
| Expectations | -0.020 | -0.213 | 0.832 |
| General Health Perception | 0.343 | 3.487 | 0.001* |
| Depression | 0.370 | 3.171 | 0.002* |
| $R^2 = 0.532$ $R^2_{adj} = 0.423$ $F = 4.872$ $p < 0.001$ * $p \leq 0.05$ | | | |

Simple regression analyses were also run to examine the influence of each of the four social support subscales on overall quality of life. Independently the social support subscale variables did not significantly account for the variance in overall quality of life (see Table 24).

Table 24. Simple Regression Summary for Social Support Subscales on Quality of Life (N = 75)

| Subscale | R ² | R ² _{adj} | F | p |
|----------|----------------|-------------------------------|-------|-------|
| 1 | 0.031 | 0.018 | 2.359 | 0.129 |
| 2 | 0.003 | -0.011 | 0.202 | 0.655 |
| 3 | 0.007 | -0.007 | 0.506 | 0.479 |
| 4 | 0.006 | -0.007 | 0.461 | 0.499 |

Subscale 1: Affectionate
 Subscale 2: Emotional
 Subscale 3: Tangible
 Subscale 4: Positive Social Support

Additional Analysis #4: Insignificant Variables on Quality of Life

Consistently, depression, social support, function, and general health perceptions significantly contributed to quality of life. It is possible that the other variables may have been obscured by these four variables. Therefore, a regression analysis was conducted omitting the significant variables from the model. The overall model was significant ($p = 0.018$) accounting for 22% ($R^2 = 0.216$, $R^2_{adj} = 0.134$) of the variance in overall quality of

life $F(7, 67) = 2.633, p = 0.018$. There were two significant variables that contributed to the model, age ($p = 0.049$) and fatigue ($p = 0.039$) (see Table 25).

Table 25. Multiple Regression Summary Insignificant Variables on Quality of Life (N = 75)

| Model | Standardized Regression Coefficient | <i>t</i> | <i>p</i> |
|---|-------------------------------------|----------|----------|
| Age | -0.241 | -2.007 | 0.049* |
| Sex Female | 0.100 | 0.890 | 0.377 |
| Race White | 0.100 | 0.848 | 0.399 |
| Pain | -0.006 | -0.046 | 0.963 |
| Fatigue | 0.263 | 2.104 | 0.039* |
| BMI | 0.222 | 1.904 | 0.061 |
| Expectations | 0.084 | 0.749 | 0.457 |
| $R^2 = 0.216$ $R^2_{adj} = 0.134$ $F = 2.633$ $p = 0.018$ * $p \leq 0.05$ | | | |

Additional Analysis # 5: Significant Bivariate Correlates on Quality of Life

Further analysis was conducted selecting only the variables that has a significant bivariate correlation with quality of life (see Table 6). For research question #5, there were 11 independent variables in the regression model on overall quality of life. In some instances, a large number of independent variables may cause an overestimation of the R^2

value (Tabachnick & Fidell, 2007). Therefore, additional exploratory regression analysis was performed using only the following variables that had a significant correlation with quality of life: (a) age, (b) social support, (c) BMI, (d) fatigue, (e) depression, (f) functional status, and (g) general health perception. The regression model with all 11 variables accounted for 62% ($R^2 = 0.621$, $R^2_{adj} = 0.554$) of the variance in overall quality of life, while this exploratory model accounted for 59% ($R^2 = 0.589$, $R^2_{adj} = 0.546$) of the variance. Social support, depression, and general health perception contributed significantly to both the original and exploratory models.

Additional Analysis #6: Symptoms and Functional Status Separate

To further evaluate symptoms, a regression analysis was performed with all three symptoms: (a) pain, (b) fatigue, and (c) depression. All the symptoms were entered simultaneously to examine the influence of symptoms on overall quality of life. The model significantly accounted for 37% ($R^2 = .370$, $R^2_{adj} = 0.334$) of the variance of overall quality of life $F(3, 71) = 13.911$, $p < 0.001$. Depression was the only significant variable in the model (see Table 26).

Table 26. Multiple Regression Summary Symptoms on Overall Quality of Life (N =75)

| Model | Standardized Regression Coefficient | <i>t</i> | <i>p</i> |
|--|-------------------------------------|----------|----------|
| Pain | -0.076 | -0.728 | 0.469 |
| Fatigue | 0.057 | 0.522 | 0.603 |
| Depression | 0.600 | 5.852 | 0.000* |
| $R^2 = 0.370$ $R^2_{adj} = 0.344$ $F = 13.911$ $p < 0.001$ * $p \leq 0.05$ | | | |

Functional Status was measured by the WOMAC scale. This tool also measures pain and stiffness in separate subscales. A regression analysis was performed to evaluate the influence of pain, stiffness, and function as measured by the WOMAC scale. The model was significant ($p = 0.001$) in accounting for 21% ($R^2 = .207$ $R^2_{adj} = 0.173$) of the variance in overall quality of life $F(3, 71) = 6.162$, $p = 0.001$. Stiffness and function were found to be significant variables in this model (see Table 27).

Table 27. Multiple Regression Summary WOMAC Subscales on Quality of Life

| Model | Standardized Regression Coefficient | <i>t</i> | <i>p</i> |
|---|-------------------------------------|----------|----------|
| Pain | 0.190 | 1.651 | 0.103 |
| Stiffness | -0.315 | -2.742 | 0.008* |
| Function | 0.331 | 3.122 | 0.003* |
| $R^2 = 0.207$ $R^2_{adj} = 0.173$ $F = 6.162$ $p = 0.001$ * $p \leq 0.05$ | | | |

Summary

Seventy-five older adults with OA were interviewed to determine the factors that influenced their overall quality of life prior to TKR. The participants were mostly married, White females who were retired, with a mean age of 69 years. The mean overall quality of life was 23.14 and the mean overall expectation score was 76.21 indicating high expectations for the outcomes of TKR surgery. The entire model accounted for 62% of the variance in overall quality of life. Characteristics of the individual, which included individual expectations, did not significantly contribute to any of the regression models in the analyses. However, characteristic of the environment (social support) as well as the health-related factors of depression, functional status, and general health perception significantly contributed to quality of life.

CHAPTER V

DISCUSSION

The purposes of this study were to explore the expectations of older adults with medically diagnosed osteoarthritis (OA) who are scheduled for total knee replacement (TKR) surgery and to examine factors that influence the older adult's quality of life prior to TKR surgery. This chapter provides a discussion of the findings in relation to current science. Also, implications for nursing practice as well as areas for future research are discussed.

Interpretation of Findings

The most common survey used to assess health-related quality of life among studies measuring outcomes of total hip and knee replacement surgery was the Medical Outcomes Study (MOS) 36-item short-form (SF-36), a generic survey of health status (Ethgen et al., 2004). The SF-36 was designed to be a comprehensive, generic measure of subjective health status (Ware & Sherbourne, 1992). Among studies of older adults with OA, the SF-36 has been used to measure not only health status (March et al., 2002), but also quality of life (Gandhi et al., 2008; Salmon et al., 2001) and health-related quality of life (March et al., 1999; Rabenda et al., 2005; Salaffi et al., 2005). However, this approach may not capture the multiple factors associated with quality of life. Because

health status and quality of life are distinct constructs (Smith et al., 1999), instruments measuring only health status may not be appropriate for measuring quality of life.

The revised Wilson and Cleary model of health-related quality of life (Ferrans et al., 2005) includes multiple factors (biological status, symptoms, functional status, general health perception, and characteristics of the individual and environment) that may influence quality of life. Because quality of life in this model is more than just subjective health status, using this model fosters a holistic approach in contrast to solely a health-related focus. The Quality of Life Index-Arthritis version III (QLI-A) tool, an instrument based on this model, has more comprehensive approach in measuring quality of life by not only assessing the older adult's satisfaction in certain areas of life, but also the individual's perceived importance of these areas. Thus, this measure allows for a more holistic approach to examining multiple factors that influence quality of life.

Quality of Life

The mean overall quality of life score for this sample was 23.14 ($SD = 3.58$). These results are higher than the mean quality of life score of 21.50 ($SD = 2.8$) reported by community dwelling older adults with physical disabilities (Levasseur et al., 2008). No other studies were found that used the QLI-A for older adults with OA. In the current study, individuals 80 years of age and older reported the highest overall quality of life ($M = 23.90$, $SD = 3.45$), followed by those aged 65 to 79 years ($M = 23.55$, $SD = 3.33$) and those aged 50 to 64 ($M = 22.25$, $SD = 3.95$). Reported mean quality of life scores on the QLI with other populations vary: (a) 16.6 ($SD = 5.9$) in individuals living with chronic pain (Gerstle, All, & Wallace, 2001), (b) 21.14 ($SD = 4.87$) in adults with end stage renal

disease (Kring & Crane, 2009), (c) 21.37 ($SD = 4.34$) in women prior to coronary artery bypass graft (Penckofer, Ferrans, Fink, Barrett, & Holm, 2005), (d) 21.40 ($SD = 6.3$) in elder adult intensive care unit survivors (Kleinpell & Ferrans, 2002), (e) 21.5 ($SD = 2.8$) in older adults with physical disabilities (Levasseur et al., 2008), (f) 23.44 ($SD = 3.55$) in adult Hispanics with Type-2 diabetes (Hu, Wallace, & Tesh, 2010), and (g) 23.54 ($SD = 3.65$) in older women with at least one chronic health problem (Nesbitt & Heidrich, 2000). While all seven of the studies included older adults, only three focused on older adults (Kleinpell & Ferrans; Levasseur et al.; Nesbitt & Heidrich). Despite the age of the population in these studies, individuals with OA of the knee in the present study reported a quality of life higher than five of the seven studies and the results were similar to the study of older women living with at least one chronic illness (Nesbitt & Heidrich). Those individuals in this study in the oldest age group (80 years and older) may have gradually accommodated for their decline in functional status and worsening symptoms, and may have experienced a response shift in their assessment of quality of life. Additionally, the older adults of this study were planning TKR surgery, which may have influenced their quality of life assessment. Thus, individuals may have rated their quality of life higher based on their expectations of positive outcomes of the TKR surgery.

The findings of the current study noted social support and functional status as significant contributors to overall quality of life. These results are similar to the only two studies found using the QLI to assess quality of life in older adults with physical disabilities (Levasseur et al., 2008; Nesbitt & Heidrich, 2000). Levasseur and colleagues found that participation in social roles and fewer obstacles in the physical environment

were the best predictors of high health and functioning quality of life ($R^2 = 0.49$, $p < 0.001$). Nesbitt and Heidrich (2000) reported that among older women with physical disabilities, physical health limitations had a significantly negative influence on quality of life, specifically symptom bother ($r = -0.52$, $p < 0.001$) and functional health ($r = -0.51$; $p < 0.001$). Therefore, social support and functional status are important to quality of life in this population. Further studies are needed to clarify the type of social support, such as social networks (Levasseur et al., 2004), social connectedness (Ashida & Heaney, 2008), and social roles (Levasseur et al., 2008), that affect quality of life in older adults with OA who are planning TKR surgery in order to develop interventions to improve quality of life in this population. Additionally, future interventional research aimed at improving the functional status of older adults with OA prior to TKR surgery may improve the individual's overall of life.

The subscales of the QLI-A provide insight into four domains of quality of life: (a) health and functioning, (b) family, (c) psychological/spiritual, and (d) socioeconomic. In this study, the health and functioning subscale of the QLI-A had the lowest mean score ($M = 20.81$, $SD = 4.61$) compared to the family subscale which had the highest mean score ($M = 25.69$, $SD = 4.13$). These results are similar to those with end stage renal disease (Kring & Crane, 2009), who also reported health and functioning as the lowest quality of life score on the QLI-Dialysis ($M = 18.64$, $SD = 5.71$), and those with physical disabilities (Nesbitt & Heidrich, 2000), who reported health and functioning as the lowest quality of life score on the generic QLI ($M = 19.1$, $SD = 4.6$). These findings support the strong influence of chronic disease on health and functioning of the

individual and provide insight into why many research studies examining quality of life focus on the disease burden or an individual's health-related quality of life. Functional status consistently predicted quality of life, and the subscale on the quality of life index including health and functioning had the with the lowest mean score than the other subscales. Although not the strongest variable in the model, there may be a connection between functional status and the other significant variables. For example, if older adults with OA of the knee experience a decline in their ability to participate in social activities such as golf or tennis, they may experience a decline in their feeling of social connectedness which may result in feelings of depression.

A minimal difference was noted between the mean values for the psychological/spiritual ($M = 24.58$, $SD = 4.16$) and socioeconomic ($M = 24.87$, $SD = 3.41$) subscales of the QLI-A. These findings are slightly higher than those of Levasseur and colleagues (2008) who reported psychological/spiritual ($M = 22.90$, $SD = 3.70$) and socioeconomic ($M = 21.80$, $SD = 2.60$) subscales of the QLI in those with disabilities. Individuals in the current study's sample reported high social support scores, and 34% of the participants reported an income level greater than \$71,000. Therefore, results may be related to the sample and findings may have been different in a sample with lower social support or financial resources. High psychological/spiritual and the socioeconomic scores coupled with the high quality of life scores on the family subscale may indicate the participants had the necessary resources and support to cope with what may otherwise be considered a poor quality of life. Thus, feeling connected to one's faith and family and a sense of economic stability may be useful factors in explaining how older adults with OA

of the knee generate, gain, or maintain their quality of life. Nurses need to assess family connectedness and economic status when developing strategies to improve the quality of life for older adults dealing with chronic diseases such as OA.

Characteristics of the Individual

Four characteristics of the individual were examined in this study: (a) age, (b) sex, (c) race, and (d) expectations. None of these variables were significant in explaining quality of life. Researchers have demonstrated that age (Lawrence et al., 2008; Murphy et al., 2008; O'Connor, 2006) and sex (American Academy of Orthopedic Surgeons, 2009; Srikanth et al., 2005) are linked to the prevalence of OA in adults and that older age and female sex are among the major determinants of poor quality of life in individuals with OA (Rabenda et al., 2005).

The prevalence of OA sharply rises at age 45 (National Public Health Agenda, 2010) and may take 10 or more years to become life-altering and debilitating. As more adults are working beyond the age of 65 (Purcell, 2009), OA can interfere with the individual's ability to perform their job duties (Theis et al., 2007) and is also likely to impede the older adults' ability to participate in recreational activities before and after retirement (CDC, 2010). Age and the demands of life vary across the stages of the lifespan and may play a significant role in the disability threat posed by OA of the knee (Rejeski & Shumaker, 1994). According to the American Association of Orthopedic Surgeons (2009), individuals undergoing TKR surgery range in ages between 60 to 80 years. Several studies targeting those with OA have found that age is not a factor in determining the outcomes of TKR surgery nor determining the need for surgery (Donell,

Neyret, Dejour, & Adeleine, 1998; Jones et al., 2001). It may be that many people are not waiting until their symptoms become unbearable but rather are having TKR surgery earlier in the disease trajectory. Therefore, age is considered in context with symptoms and degree of disease.

The participants in this study were representative of the U.S. population of those with OA of the knee. The mean age was 69 years ($SD = 8.18$) and ranged from 52 to 86 years. Other studies including older adults with OA have reported age means as follows: (a) 54.6 years ($SD = 18.2$) (Mancuso et al, 2001), (b) 68.28 years ($SD = 9.85$) (Gonzalez Sáenz de Tejada et al., 2010), and (c) 71 years ($SD = 8.0$) range from 51-86 years (Nilsson, Toksvig-Larson, & Roos, 2009). Bivariate correlation analysis revealed a positive correlation between the two variables, age and quality of life. Age was also negatively correlated with functional status and BMI. However, age was not a significant factor in explaining overall quality of life. Age was significant ($p = 0.049$) only when the predicting variables were removed and the factors that were insignificant were analyzed.

Sex did not significantly explain quality of life in this model. Females are more likely than males to develop OA and to have more severe OA, especially of the knee (O'Connor, 2006; Srikanth et al., 2005). Researchers continue to explore the relationship between hormonal factors and the risk for developing or the progression of OA in females (O'Connor; Zhang & Jordan, 2008). In the current study, 76% of the participants were female ($n = 57$), which is consistent with previous studies reporting greater than 50% of their samples to be female sex (Mancuso et al. 2001; Gonzalez Sáenz de Tejada et al., 2010). Females reported a lower mean quality of life score of 22.83 ($SD = 3.71$)

compared to males ($M = 24.14$, $SD = 3.04$). Reasons for this difference in quality of life ratings vary. While, females with OA are more likely than males to seek treatment for OA, they are less likely than males to discuss the need for TKR surgery with their physician (Hawker, et al., 2000). This delay in surgical information may relate to differences between the sexes regarding social support (O'Connor, 2006). Despite the underlying causes, females are presenting later in the course of their disease (Hawker et al.) and as seen in the current sample, report a lower quality of life. Further research is needed to assess the differences between males and females to improve the provider-patient communication early in the disease trajectory regarding treatment options that could positively affect quality of life.

The prevalence of OA varies among racial groups. Research shows that among women ages 60 years and older, 38% of Whites and 61% of Blacks have radiographic signs of knee OA (Hirsch et al., 2001). Researchers have also demonstrated that racial disparities exist among older adults and the utilization of TKR surgery for treatment of severe OA (Emejuiwe et al., 2007; Steel et al., 2008). Whites are two times more likely to undergo TKR surgery than Blacks (Figaro et al., 2004; Suarez-Almazor et al., 2005). In fact, the annual rate for TKR is highest for White women (5.9 procedures per 1000) and lowest for Black men (1.84 per 1000) (Skinner, Weinstein, & Spover, 2003).

In the current study, Whites accounted for over 86% of the sample ($n = 65$). The quality of life scores examined by race were relatively equal with White individuals reporting a mean quality of life score of 23.11 ($SD = 3.54$) and Blacks reporting a mean score of 23.33 ($SD = 4.05$). Race was not a significant variable explaining quality of life.

These results are not consistent with Ibrahim and colleagues (2002) who reported that African American race was negatively correlated with global quality of life ($\beta = -0.12$; $p = 0.004$). These results may differ due to the small number of Blacks in the current study. Because Black populations may benefit the most from interventions to increase quality of life, further studies are needed to determine if the Black race is a significant factor in quality of life. While race and culture are separate concepts, culture is often associated with race. Studies are needed to clarify the affects of culture and race on quality of life.

Expectations

Expectations did not significantly contribute to overall quality of life in any of the quality of life regression models. Male participants reported a higher mean expectation score ($M = 78.58$, $SD = 10.10$) than females ($M = 75.46$, $SD = 13.17$). These findings are similar to those of a recent study ($N = 881$) examining the effects of individual expectations on health-related quality of life in adults with a mean age of 68.28 years ($SD = 9.85$) (no range reported) and who are planning total knee or hip replacement for OA (Gonzalez Sáenz de Tejada et al., 2010). More specifically, 77% of persons with OA of the knee in the present study rated high expectations for performing their usual daily activity following TKR surgery, while 73% reported high expectations for their ability to interact with others. Gonzalez Sáenz de Tejada and colleagues found comparable ratings, 89% and 87%, respectfully.

The participants of the current study demonstrated comparable high expectations for improved overall psychological well-being (88%) as those in another study (87%)

(Gonzalez Sáenz de Tejada et al., 2010). However, in the present study, 59% of the individuals reported high expectations (back to normal or complete improvement) related to relief of pain while 77% indicated high expectations for improved ability to walk. These proportions are significantly lower than the findings by Gonzalez Sáenz de Tejada and colleagues who reported 95% of individuals report high expectations of pain relief and 96% had high expectations of improved ability to walk. Because cultural influences play a role in how one forms their expectations (Janzen et al., 2006), the lower ratings in the present study may have been due, in part, to cultural differences. Gonzalez Sáenz de Tejada and colleagues reported findings from a sample based in Spain while the current study consisted of native born U.S. individuals. Further, the sample in this comparative study (Gonzalez Sáenz de Tejada et al.) included adults who were planning total joint replacement of either the knee (61%) or hip (39%) and individuals who had undergone total joint replacement in the past. Thus, the sample including total hip replacement and a prior experience may have also influenced the results.

Studies evaluating pre-operative expectations of individuals undergoing total joint replacement (Gandhi, Davery, & Mahomed, 2009; Mahomed et al., 2002), total hip replacement (Mancuso et al., 2003; Nilsson et al., 2009), TKR (Razmjou, Finkelstien, Yee, Holtby, Vidmar, & Ford, 2009), and lumbar spine (Saban & Penckofer, 2007) surgery have shown that those individuals with higher expectations of surgery outcomes demonstrate better post-operative outcomes. Unfortunately, there are limited studies specifically evaluating the expectations of older adults with OA prior to TKR surgery. Because research found that individuals with higher expectations of the outcomes of total

joint replacement and who reported their expectations were fulfilled exhibited greater gains in health-related quality of life 12 months post-operatively (Gonzalez Sáenz de Tejada et al., 2010), studying expectations with those who have OA and are scheduled for TKR surgery is important to enhance provider-patient communication related to realistic expectations of outcomes of TKR and how they may affect the individual's overall quality of life.

Age and race may influence expectations of TKR surgery in those with OA of the knee. In bivariate analysis, age was not significantly correlated with expectations. However, the expectation scores for TKR surgery varied among the different age groups of the sample. Those individuals ages 80 years and older reported the lowest overall expectation scores ($M = 70.47$, $SD = 14.14$) compared to individuals ages 65-79 years ($M = 77.11$, $SD = 11.2$) and those less than 65 years of age ($M = 76.82$, $SD = 13.66$). These findings are consistent with previous research focused on expectations for outcomes of total joint replacement (Gonzalez Sáenz de Tejada et al., 2010). Race was also not correlated with expectations. Among the two racial groups represented in the current study, Whites reported a mean overall expectation score of 76.34 ($SD = 12.72$) compared to Blacks' mean score of 75.40 ($SD = 11.20$). Ibrahim and colleagues (2002) reported that Blacks were less willing to consider joint replacement (odds ratio 0.50, 95% CI 0.30-0.84) than Whites due to differences in the expectations of the outcomes of the treatment. In fact, Blacks differed from Whites in their expectations of extended post-operative recovery ($p < 0.001$), expectations of pain ($p < 0.001$), and expectations of difficulty with walking ($p < 0.001$) following joint replacement surgery and were

therefore, less likely than Whites to consider joint replacement surgery. Black older adults have reported a lack of confidence in the efficacy of the joint replacement surgery (Ibrahim et al., 2002) and a general distrust of healthcare providers (Suarez-Almazor et al., 2005). The findings from the current study may differ from another study with more Black participants. Further research is needed to identify the factors that influence individual expectations and how those expectations influence quality of life and treatment option decisions, especially in Blacks.

Characteristic of the Environment

Ashida and Heaney (2008) proposed that a lack of social connectedness may result in feelings of loneliness for the older adult. Symptoms of OA, such as pain and fatigue, along with decreased functional status may result in a lack of independence and an inability to remain engaged in society (Ashida & Heaney). In turn, this may result in decreased quality of life for the older adult with OA. In this study, social support was a significant ($p < 0.001$) contributing variable in all regression models. In fact, individuals reported high levels of social support, and this had a significant positive bivariate correlation between overall social support and quality of life. Consequently, the feelings of connectedness among this sample may have, in part, contributed to their quality of life.

Social support was found to have a moderate negative correlation with depression. This finding supports previous research by Sherman (2003) who also found that depressive symptoms and social support were moderately correlated in older adults with OA of the knee. Other research has supported associations between an individual's social environment and quality of life (Blixen & Kippes, 1999; Levasseur et al., 2004).

Specifically, when persons denoted their social network had few obstacles (Levasseur et al., 2004), social support served to decrease stress of chronic disease (Blixen & Kippes), and individuals demonstrated greater satisfaction with participation in social roles (Levasseur et al., 2008) and social relationships (Gabriel & Bowling, 2004), their quality of life improved. These findings along with those of the present study, demonstrate the importance of the environment and quality of life. Specifically, the influence of social support diminishes the negative impact of chronic diseases, such as OA, on overall quality of life. Further research is needed to examine the characteristic of the environment, specifically the components of social support that impact overall quality of life from a holistic perspective.

Health-Related Factors

The four health-related factors (biological function, symptom, functional status, and general health perception) along with characteristics of the individual and environment in the model significantly accounted for 62% of the variance in overall quality of life. Three of the four significant factors in the model were health-related factors: depression, functional status, and general health perception. These findings support using a holistic approach when examining quality of life in older adults with OA scheduled for TKR surgery.

Biological Function

For this study, the mean BMI was 32.62 ($SD = 7.23$) with a range of 23.41-54.94. These findings are similar to Gonzalez Sáenz de Tejada and colleagues (2010) study of

adults with OA who reported a mean BMI of 29.34 ($SD = 4.59$) and Creamer and colleagues (2000) who reported a mean BMI of 31.4 ($SD = 6.8$). Obesity has been considered to have a negative influence on the outcomes of TKR, and in some cases overweight individuals have been discouraged from having TKR surgery (Deshmukh, Hayes, & Pinder, 2002). However, research is lacking to support this practice. In fact, researchers have found that body weight does not directly influence the outcomes of TKR surgery (Deshmukh et al., 2002), and obese individuals demonstrate significantly greater improvements in quality of life scores following TKR surgery than those who are not obese (de Leeuw & Villar, 1998). In the present study, bivariate analysis revealed that BMI was negatively correlated with overall quality of life.

Body mass index was positively correlated with depression. Hence, BMI may affect the symptoms associated with OA, such as depression which in this study was a significant variable in each of the regression models on quality of life. While BMI did not significantly contribute to quality of life in any of the regression models, BMI may be indirectly influencing the quality of life among older adults with OA of the knee who are planning TKR.

Symptoms

Pain, fatigue, and depression were the symptoms in this study. Depression is an important factor to include when measuring quality of life in older adults with OA.

Depression, as measured by the Geriatric Depression Scale Short Form (GDS-SF), significantly influenced quality of life. The mean GDS-SF score for participants in this study was 2.43 ($SD = 2.16$). Using a cut-point of 5 on the GDS-SF, 11% ($n = 8$) of

individuals in this study were screened for depression. This is comparable to other studies that examined depression among older adults with OA (Ferreira & Sherman, 2007; Hirvonen et al. 2006; Huguet et al., 2008; Jakobsson & Hallberg, 2006; Lingard et al., 2004). Research has demonstrated that individuals with arthritis have a higher prevalence of depression as compared to those without arthritis (Dickens et al., 2002) and higher levels of depressed mood are significantly ($p < 0.001$) associated with being a female (Sale et al., 2008). The National Health Survey data from 2002 denoted that one in four adults with arthritis report frequent depression (Shih et al., 2006). Many times this depression may go undetected by the health care professional and, if not properly assessed and treated, may result in a downward trajectory of health for the older adult and a lower quality of life.

Depression

In this study, females reported higher mean scores on the GDS-SF ($M = 2.63$, $SD = 2.27$) than males ($M = 1.78$, $SD = 1.67$). Also, similar to the findings of Sale and colleagues (2008), Blacks ($M = 2.80$, $SD = 2.35$) reported higher mean scores on the GDS-SF than Whites ($M = 2.37$, $SD = 2.15$). Depression positively correlated with fatigue, pain, functional status, as well as BMI. Depression also had a strong significant negative correlation with social support, general health perception, and overall quality of life. These findings are consistent with previous studies which have found a high prevalence of depressive symptoms among older adults with OA (Sale et al., 2008). The researchers (Sale et al.) found higher levels of depressed mood to be significantly associated with being female ($\beta = -0.04$; $p = 0.027$), higher pain ($\beta = 0.16$; $p < 0.001$),

fatigue ($\beta = 0.15$; $p < 0.001$), negative life events ($\beta = 0.06$; $p = 0.005$), coping behavior ($\beta = 0.61$; $p < 0.001$), and a history of treatment for depression ($\beta = -0.12$; $p < 0.001$). The results of the current and previous research demonstrate that the older adult with OA may be at high risk for developing clinical depression, and pain, fatigue, and negative life events may contribute to the risk (Sale et al.). Further, because older adults, especially females with OA, are more vulnerable to depression, research focused on effective interventions and strategies targeted to older women with OA is essential.

Pain

Pain is the primary indication for joint replacement surgery (Nilsodoter et al, 2009). Pain and disability are significant predictors of depression among individuals with arthritis (Blixen & Kippes, 1999), and arthritis severity accounts for up to 38.5% of the variance in depression of older adults with OA (Sale et al., 2008). Surprisingly, pain was not a significant factor in the overall quality of life of older adults with OA of the knee. In this sample, 63% of the persons rated their current pain level as a five or less on a zero to ten scale with ten being extreme pain. On average, pain ratings for women ($M = 5.39$, $SD = 2.40$) were higher than men's ($M = 4.39$, $SD = 2.17$); and Blacks ($M = 7.00$, $SD = 2.40$) higher than Whites ($M = 4.86$, $SD = 2.26$). Higher pain in Blacks may be a related to waiting longer to have surgery due to mistrust of healthcare. Bivariate correlations showed that pain had a positive significant correlation with fatigue, depression, and functional status, but not overall quality of life. Even when depression and function were removed from the model, pain did not contribute significantly to overall quality of life.

Pain scores varied by age. Individuals ages 65 -79 years reported lower pain scores ($M = 4.88$, $SD = 2.10$) than those ages 50 to 64 ($M = 5.46$, $SD = 2.78$) or those ages 80 and older ($M = 5.44$, $SD = 2.46$). This is consistent with previous research that showed no age-related differences in joint pain prior to total knee or hip replacement surgery (Jones et al., 2001). If older adults believe that chronic diseases are an inevitable part of aging and expect that pain and functional disabilities will worsen with aging, they may make adaptation to their life and learn to cope with the pain (O'Neill, Jinks, & Ong, 2007), be less likely to seek medical treatment for the symptoms, and consequently, experience a lower quality of life. For example, many individuals in the present study questioned if they were experiencing enough pain to warrant undergoing TKR surgery. Conversely, if older adults expect to have improved physical function, to return activities they value and enjoy, and to improve their quality of life after surgery, they may have higher expectations of reducing symptoms, such as pain (Jacobson et al., 2008).

Fatigue

Fatigue was a prevalent symptom among this sample of older adults. Over 97% reported some level of fatigue with a mean fatigue score of 5.17 ($SD = 2.48$) on a zero to ten scale. This is more prevalence of fatigue than the 67% of older women who had suffered a myocardial infarction (Crane, 2005) or the 91% of those with end stage renal disease (Kring & Crane, 2009) who reported fatigue. Fatigue was positively correlated with functional status. These findings are similar to those of Murphy et al. (2008) who found that among women ages 55 and older with OA, fatigue escalated throughout the day and was strongly associated with decreased physical activity ($\beta = -30.1$, $p = 0.04$).

Older adults may tend to limit their activities due to increasing fatigue, which may lead to a feeling of social isolation and lack of connectedness. This may, in turn, result in a more depressive mood. In this study, fatigue was non-significant in all of the regression models except when the significant variables, such as functional status, were removed and only the non-significant variables were examined. The model, including only non-significant variables, accounted for 22% of the variance in overall quality of life and the significant contributing variables were fatigue ($p = 0.039$) and age ($p = 0.049$). These findings may indirectly support a reciprocal relationship between symptoms, specifically fatigue, and other factors such as functional status, depression, general health perception, and social support.

According to the revised Wilson and Cleary model of health-related quality of life (Ferrans et al., 2005), as older adults with OA of the knee experience an increase in symptoms, such as pain, fatigue, and depression, a resulting decline in functional status occurs. However, declining functional status due to one symptom, such as pain, may lead to another symptom, such as depression. While reciprocal relationships between the variables are thought to exist, these are not represented in this model (Saban et al., 2007). Larger samples are needed to statistically examine the reciprocal relationships in this model to better understand the factors that influence the older adults' quality of life prior to TKR surgery.

Functional Status

Functional status, as measured by the physical functioning subscale of the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) index,

quantifies the older adults' difficulty with performing their normal daily activities. Most studies evaluating quality of life, health-related quality of life, or health status in older adults with OA used the WOMAC index to measure functional status (Creamer et al., 2000; Ethgen et al., 2004; Jones et al., 2001). Higher scores on the WOMAC indicate more difficulty with function or performing daily activities and/or routine.

In the current study, the mean physical functioning score was 32.4 ($SD = 10.89$). Earlier studies have reported similar or higher mean functioning scores: (a) 32.6 ($SD = 22.3$) (Gignac et al., 2006), (b) 42.1 ($SD = 22.3$) (Creamer et al., 2000), (c) 43.0 ($SD = 18.0$) (Jones et al., 2001), (d) 45.4 ($SD = 18.8$) (Lingard et al., 2004), and (e) 62.64 ($SD = 17.20$) (Gonzalez Sáenz de Tejada et al., 2010). Those studies with higher mean scores, indicating lower physical functioning (Jones et al.; Lingard et al.; Gonzalez Sáenz de Tejada et al.), included individuals with OA of the knee and hip and larger sample sizes ranging from 450 to 881. Thus, the differing results from this study may be related to the sample.

Researchers have shown that limitations to physical function are associated with poor quality of life (Ackerman et al., 2005; Jakobsson & Hallberg, 2006) and higher psychological distress, such as depression, in older adults with OA (Ackerman et al.; Theis et al., 2007). In this study, functional status had a moderately negative correlation with quality of life and was a significant predictor variable for quality of life. These findings may be suggestive of the reciprocal relationships among the significant variables. For example, if the older adult experiences more difficulty with ambulation, they may not participate in their favorite activities which may lead to a feeling of social

isolation, sadness, or depression. Consequently, as the older adult experiences more difficulty with function and performing daily activities, quality of life declines.

Findings from this study reflect the individual's self-reported functional disability rather than actual disability. It is possible that a *disability paradox* may have occurred in this sample. A *disability paradox* occurs when individuals report higher quality of life scores despite moderate to severe disability (Bowling, Seetai, Morris, & Ebrahim, 2007). Thus, a *disability paradox* highlights the importance of individual perception of disability in defining one's world view and quality of life (Albrecht & Devlieger, 1999). If individuals would have been assessed for their quality of life solely based on their functional abilities, the quality of life interpretations may have been misrepresented. The potential of a *disability paradox* occurring in this sample is lessened by the application of a conceptual framework which takes into account multiple factors, not just functional status, that may influence overall quality of life.

General Health Perception

General health perception is usually assessed in terms of satisfaction with overall health status among the studies of older adults with OA (Hawker et al., 1998; Lingard et al., 2006; Mahomed et al., 2002). In the current study, general health perception was measured by a single global question which asked the participant to rate their overall current health status on a scale from zero (poor) to ten (excellent). The mean score was 7.04 ($SD = 2.18$). General health perception was found to have a moderately negative correlation with depression and quality of life. In a study among older adults with arthritis, 55% ($N = 10,923$) of the individuals with OA of hip and knee rated their general

health as fair or poor (Dominick et al., 2004a). Conversely, in the current study, only 25% rated their current health status as fair or poor (score of 5 or less). This difference may be related to a smaller sample size and the individual's decision to have surgery in the current study. However, the findings indicate that despite dealing with the symptoms and disability associated with OA of the knee, the majority of individuals in the current study perceived their overall health status to be good.

The findings of the present study suggest a meaningful relationship between quality of life and general health perception in older adults with OA of the knee. During data collection, the researcher noted that many of the individuals asked if they were to include OA of the knee when evaluating their general health. As a result, the ratings for general health perception may have been the result of a response shift which is a phenomenon of fundamental importance to researchers, clinicians and policy makers (Schwartz & Sprangers, 1999). Many times people with chronic diseases, in this case OA of the knee, must accommodate for their illness. This adaption process, known as response shift, involves a change in the internal standards of measurement, values, or conceptualization of quality of life (Schwartz & Sprangers; Sprangers & Schwartz, 1999) which may result in an overestimation or underestimation of the attribute, in this case, general health perception (Razmjou, Schwartz, Yee, & Finkelstein, 2009). The concern with response shift and the revised Wilson and Cleary model of health-related quality of life is the ability of the model to detect the underlying basis of the response shift (Sale et al., 2008). Future studies aimed at identifying the psychological factors that may

influence the individual's ability adapt to OA and how response shift may affect an individual's overall quality of life are needed.

Any response shift in this study may be related to the individual's expectations of a successful surgical repair of the knee. Although expectations did not significantly contribute to overall quality of life for this sample, expectations may have had an indirect influence through the individual's general health perception rating. The participants of this study made the decision to have TKR surgery as a "curative" treatment for OA of their knee. Thus, it is possible that a response shift may have occurred based on the individuals' adjusted internal standards and expectations for positive outcomes of their surgery.

Implications for Nursing

To improve health care and reduce public expenditures related to OA of the knee in older adults, researchers, educators, policymakers, and clinicians are interested in ways to better measure and enhance quality of life. Findings from this study add to the body of knowledge focused on older adults with chronic disease and provide the foundation for future studies to further examine factors that influence an older adult's assessment of their quality of life. The results of this study combined with future studies will be useful to nurse educators as they educate nurses related to caring for older adults with chronic disease.

Older adults are more likely to view a chronic disease, such as OA, as an expected consequence of the aging process and may cope with the issues associated with chronic

disease by altering the lens by which they view their life. The older adult may feel that they must live their life within the limits set by the chronic disease. For most individuals, the progression of OA gradually occurs over time and may result in an insidious response shift resulting in higher ratings of overall quality of life. With an aging society, there is a desperate need for improved arthritis symptom management strategies that address a broad range of symptoms and are accessible to all older adults. Continued support from policymakers is needed for public education programs related to arthritis management. It is also important for nurses and other healthcare clinicians to recognize that it may not be the chronic disease that is influencing the individual's quality of life but rather, the lens by which the older adult is evaluating their current quality of life. Despite the individual's quality of life rating, nurses must be diligent in assessing the factors known to be associated with OA, such as depression, pain, and fatigue, which may require timely clinical interventions.

This study is the first known to apply a holistic model, the revised Wilson and Cleary model of health-related quality of life (Ferrans et al., 2005), to a sample of older adults with OA of the knee who are planning first time TKR surgery. The model provides a guide for empirically understanding the relationships between the factors, such as expectations, social support, symptoms, functional status, and general health perception, and the association of TKR surgical intervention and quality of life. Using this model nurses, through disciplined inquiry, will have the knowledge to (a) appropriately develop and implement interventions for health promotion to decrease the burden of OA among older adults, (b) develop symptom management strategies to improve the self-efficacy of

older adults through self-management programs, and (c) help define realistic expectations through education.

Few studies have examined the influence of older adult's expectations on quality of life (Saban & Penckofer, 2007; Staniszewska, 1999). Research has demonstrated that individual expectations are important predictors of satisfaction and functional outcomes for total joint replacement surgery in orthopedic populations (Mahomed et al., 2002, Mancuso et al., 2001). More recently, Gonzalez Sáenz de Tejada and colleagues (2010) reported that individuals undergoing total joint replacement (knee or hip) who reported fulfilled pre-operative expectations at three and 12 months post-operative had significantly greater gains in health-related quality of life than those individuals who did not have their pre-operative expectations met. In the present study, individuals preparing for TKR surgery expressed high expectations for the outcomes of the intervention. More specifically, they expected an improved ability to perform activities of daily living and to interact with others. Because expectation scores are directly correlated with satisfaction scores (Campbell et al., 1978) and satisfaction scores indicate quality nursing care, expectations are important to assess not only prior to surgery but also at various intervals post-operatively. In fact, research suggests that expectations vary between three and six months and stabilize at 12 months post-operatively and should be evaluated accordingly (Gonzalez Sáenz de Tejada et al., 2010).

Although expectations did not directly contribute to overall quality of life, it is possible that there is an indirect influence through other health-related factors. Individual expectations have traditionally been linked to patients' satisfaction with outcomes and are

influenced by individual's past experiences (Campbell et al., 1978). When the individual's reality does not match their expectations, emotional feelings, such as depressive mood, may result. The Hospital for Special Surgery Total Knee Replacement Survey is an easy to administer instrument that is readily available and may be used in the orthopedic office to quantify the individual's expectations. This tool would provide important information regarding the older adult's expectations prior to and following TKR surgery and would be useful in fostering meaningful dialogue between the health care provider and the older adult to more effectively align provider-patient expectations.

Symptom burden associated with OA may be significant for older adults. Many individuals in the present study reported they had never talked with their orthopedic surgeon regarding their fatigue but had adapted their activities in an effort to manage the symptom. Many clinicians may ask "how are you doing" and the older adult answers that they are "doing fine" because they have accommodated for their chronic disease and the associated symptoms. A more targeted assessment is needed. When assessing symptoms at a clinical visit, pain is a symptom frequently evaluated rather than fatigue or depression. Both fatigue and depression can be efficiently assessed using measures such as a visual analogue scale or a tool such as the GDS-SF. The GDS-SF is a short 15 item questionnaire that is easily administered in less than 5 minutes. Measuring multiple symptoms may encourage the older adult to communicate their full range of symptoms that may be considerably affecting their quality of life.

Intensity of symptoms reported by the older adult with OA may vary according to the time of day. Many of the participants in the current study reported that their pain and

fatigue increased throughout the day and were dependent on their physical activity levels. Some even reported that external environmental factors such as the weather played a role in their pain severity. The time of day that an individual presents to the clinic may have an influence on the individual's rating of their symptoms. For example, individuals presenting early in the morning may report less pain and fatigue than those presenting later in the day. Clinicians should not only ask the status of their current symptoms, such as pain, but should also assess their average rating of symptoms through a typical day and discern how symptoms vary with activity. This information is essential to understanding symptom manifestations and how to effectively intervene to minimize or mitigate symptoms.

Recommendations for Future Research

In the present study, four out of 11 variables were important factors influencing overall quality of life in older adults with OA: (a) social support, (b) depression, (c) functional status, and (d) general health perception. Studies are needed to further identify and examine other factors that may influence quality of life of the older adult with OA. For example, once these four significant factors were removed from the model and the non-significant variables were tested, fatigue and age were significant in overall quality of life. There is currently limited research available that assess the influence of fatigue on quality of life in those OA. Many individuals and health care professionals attribute fatigue to the aging process (Power, Badley, French, Wall, & Hawker, 2008). Therefore, many older adults adapt their lifestyle and activities to accommodate and cope with the

fatigue on a daily basis. Future studies that examine the relationship of symptoms such as fatigue and depression with other individual characteristics, such as coping, may yield greater insight into the influence of individual and environmental characteristics on overall quality of life. Additionally, future studies are needed to evaluate the individual's fatigue level post-operatively to determine if it is improved once the other factors such as depression and functional status are addressed. More importantly, studies should measure current symptoms, average of symptoms over a specific time period, and symptom associated factors, such as physical activity or weather.

Depression associated with OA requiring TKR surgery was a significant variable in explaining overall quality of life. However, further exploration of symptom burden and the impact on an individual's life with OA of the knee is warranted. Symptoms are used by individuals as an indicator of their illness and older adults with OA may experience multiple concurrent symptoms or symptom clusters. A symptom cluster has been defined as groups of more than two symptoms that occur together, concurrently, and interrelated but are not required to have the same etiology (Dodd, Miaskowski, & Paul, 2001; Kim, McGuire, Tulman, & Barsevick, 2005). Studies examining symptom clusters are needed to examine the effects of multiple co-occurring symptoms in older adults with OA.

Symptoms cluster identification is of clinical importance because simultaneous management of multiple symptoms could lead to tailored interventions that are based on an individual patient's symptomatology. The prevalence of symptom clusters and their affect on the older adult's quality of life and functional status have not been explored in older adults with OA of the knee. To date, research has focused primarily on individual

symptoms such as pain. Unfortunately, this approach is limited in its utility to clinicians for guiding practice when older adults present with multiple concurrent symptoms. Although continued research on single symptoms is important and should continue, it is imperative that symptom management research focus on evaluating multiple symptoms that concurrently exist in older adults with OA. Thus, applying a multiple symptom approach to identify the prevalence and phenotype of symptom clusters in older adults with OA of the knee is the first step to better understanding the synergistic effect of the concurrent symptoms of OA and developing effective interventions aimed at improving symptom management for older adults.

Characteristics of the individual, specifically expectations, were not significant in this study. However, the effect of expectations is not clear. Further studies are needed to evaluate the relationship of individual expectations and other factors that influence quality of life. Trending expectations over time to identify those that were met or not met following TKR surgery and examining the influence of meeting or not meeting expectations on overall quality of life may provide better insight into the role of expectations in treatment outcomes. The present study consisted of individuals who had made the decision to have TKR surgery and most had attended a pre-operative joint class prior to their interview. Consequently, this sample population may have had higher expectations for the outcomes of the TKR surgery than those who do not attend a pre-operative class. It is also possible that older adults in this sample had reached their *breaking point*: the point when the individual with OA of the knee realizes they require TKR surgery (Hall et al., 2008). Hall and colleagues contend that the breaking point

consist of: (a) exhaustion of medical treatments for affected knee and constant pain; (b) living with functional limitations, and limits to leisure and social activities; and (c) expectations of the outcomes of TKR surgery. Expectations of individuals who have not chosen surgical intervention may be different from those in the present study. Future studies should identify those individuals who are living with OA of the knee, but have not reached their breaking point to compare their expectations with those who have made the decision to have surgery.

Research is also warranted to explore how expectations of the individual are met, non met, or changed following TKR surgery and how these factors influence the individual's overall quality of life. The gap between what an individual expects to occur and the actual experience is the basis for an individual's assessment of quality of life. Simply reporting an individual's satisfaction score with the outcomes of the treatment is not sufficient to explain if their expectations were met and how their expectations affect quality of life following TKR surgery. A follow-up study with the current population at three and six months post-operatively is warranted to gain insight to the factors that influence the older adult's quality of life. Once a better understanding of expectations is gained, interventions may be developed to educate the older adults regarding realistic expectations for the outcomes of TKR surgery.

The mostly White female convenience sample in this study was representative of the U.S. OA population among older adults. Research has identified that many older Black adults do not chose TKR as a treatment option for OA of the knee due to differences in expectations of the outcomes (Suarez-Almazor et al., 2005). Further

research is needed to more closely evaluate the influence of expectations and other factors on the decision to have TRK surgery and overall quality of life in non-White racial groups.

Characteristic of the environment, as measured by social support, was significant in all of the regression models in the current study. However, because none of the subscales predicted quality of life, it is unclear how social support influences an individual's decision to have TKR surgery and their quality of life. Comparison studies to evaluate the perceived social support among individuals who have made the decision to have TKR versus those who have not made the decision may clarify the relationship between social support and quality of life. More studies are needed to further evaluate the influence of social support for older adults undergoing TKR surgery.

Individuals in the current study had made the decision to have TKR surgery as a treatment for OA of the knee. General health perception was also a consistently significant variable for explaining overall quality of life. It is possible that the participants rated their general health perception based on their expectation of improved symptoms and function outcomes following the TKR surgery. Ongoing research is needed to further evaluate the relationship of expectations, decision, general health perception and quality of life.

Because older adults with OA of the knee may have employed coping mechanisms to accommodate their chronic disease, an underestimation of certain factors, such as symptoms or functional status, may have occurred. Further studies are needed to examine underlying relationships between the multiple factors that influence an

individual's overall quality of life. Using structural equation modeling to test the revised Wilson and Cleary model of health-related quality of life may not only help support the hypothesized relationships in the model but also account for error in measurement. Additionally, future testing is needed to explore expectations as a separate factor in the revised Wilson and Cleary model. Expectations are dynamic unlike the other characteristics of the individual, such as age, sex, and race, which are static concepts. Conceptualizing expectations as a factor in the model that may directly influence quality of life and may be influenced by characteristics of the individual and environment would allow for more specifically analyzing the influence of expectations on quality of life. Finally, using the model to explore the influence of expectations post TKR surgery may reveal a more temporal relationship between expectations and quality of life.

The present study did not assess sleep as a factor related to quality of life. Many of the study participants indicated that their sleep had changed with worsening symptoms and function related to OA. For example, individuals antidotally reported that their sleep was consistently interrupted by the pain in their knee. This required them to change positions in the bed or as many stated, sleep in a chair. The older adults in this study attributed their fatigue to lack of uninterrupted sleep. Many also reported sleeping during the day which interfered with their ability to complete their daily activities. Further research is needed to examine the relationship between sleep, symptoms, and overall quality of life among older adults with OA of the knee. Findings may assist healthcare professionals in designing and implementing symptom management strategies to improve overall quality of life.

Summary

The purposes of this study were to explore the expectations of older adults with medically diagnosed OA who are scheduled for TKR surgery and to examine factors that influence the older adult's quality of life prior to TKR surgery. Social support, depression, functional status, and general health perception had the greatest influence on overall quality of life. Healthcare professionals are in a pivotal position to assist older adults in effectively responding to the challenges of physical, psychological, and social aspects of life impacted by OA. Individual expectations of the outcomes of TKR surgery were not significant in explaining overall quality of life directly. However, there may be indirect influences that are not yet clear and require further study. A shift from the negative paradigm of aging with the tendency to attribute symptoms and physical function limitations to the aging process must occur. Simultaneously employing quantitative and qualitative methodological approaches to examine quality of life in older adults with OA of the knee may provide greater insight to the specific factors that influence an individual's assessment of quality of life. Future studies should continue to clarify interventions to improve the quality of life and overall individual sense of well-being among older adults living with OA. As a result, older adults will ultimately benefit by adding quality years to life.

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APPENDIX A

DEMOGRAPHIC INFORMATION FORM

ID # _____

Date of Collection _____

Current Age _____

Sex Male Female

Race (which one do you identify yourself as most)?

- White Non-Hispanic
- Black Non-Hispanic
- Hispanic
- Asian
- Pacific Islanders/Native Hawaiian
- Native American/Alaskan Native

Marital Status Married
 Single
 Divorced
 Widowed

Do you live alone? Yes No

Do you have a caregiver? Yes No

Number in household (including yourself) _____

Annual Household Income

| | |
|--|-----------------------|
| | \$0-10,999 |
| | \$11,000-20,999 |
| | \$21,000-30,999 |
| | \$31,000-40,999 |
| | \$41,000 – 50,999 |
| | \$51,000-60,999 |
| | \$61,000-70,999 |
| | Greater than \$71,000 |

ID # _____

Demographic Information Form Continued

Employment status _____ Employed
_____ Retired Since when _____
_____ Unemployed Since when _____

If employed, type of employment

_____ Skilled
_____ Managerial
_____ Clerical
_____ Professional
_____ Technical
_____ Self-employed/work at home

Have you attended joint camp? Yes No

How would you rate your current pain level?

0 1 2 3 4 5 6 7 8 9 10
No Extreme
Pain Pain

How would you rate your current fatigue level?

0 1 2 3 4 5 6 7 8 9 10
No Extreme
Fatigue Fatigue

How would you rate your current health?

0 1 2 3 4 5 6 7 8 9 10
Poor Excellent

ID # _____

Demographic Information Form Continued

Planned date of surgery _____ R Knee L Knee

Surgeon _____ Hospital _____

Current Height _____ inches

Current Weight _____ lbs/kg

Current medications taking regularly (including herbal and supplements)

| Medication | Dose | Frequency |
|------------|------|-----------|
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Past Medical History/Comorbidities

APPENDIX B

HOSPITAL FOR SPECIAL SURGERY KNEE REPLACEMENT EXPECTATIONS SURVEY

Due to copyright regulations, the Hospital for Special Surgery Knee Replacement Expectations Survey cannot be published. To obtain a copy of the instrument refer to Mancuso et al., 2001 & 2008 for author contact information.

APPENDIX C

MEDICAL OUTCOMES STUDY: SOCIAL SUPPORT SURVEY

Medical Outcomes Study: Social Support Survey Instrument

People sometimes look to others for companionship, assistance, or other types of support. How often is each of the following kinds of support available to you if you need it? Circle one number on each line.

| | None of the time | A little of the time | Some of the time | Most of the time | All of the time |
|--|------------------|----------------------|------------------|------------------|-----------------|
| Emotional/informational support | | | | | |
| Someone you can count on to listen to you when you need to talk | 1 | 2 | 3 | 4 | 5 |
| Someone to give you information to help you understand a situation | 1 | 2 | 3 | 4 | 5 |
| Someone to give you good advice about a crisis | 1 | 2 | 3 | 4 | 5 |
| Someone to confide in or talk to about yourself or your problems | 1 | 2 | 3 | 4 | 5 |
| Someone whose advice you really want | 1 | 2 | 3 | 4 | 5 |
| Someone to share your most private worries and fears with | 1 | 2 | 3 | 4 | 5 |
| Someone to turn to for suggestions about how to deal with a personal problem | 1 | 2 | 3 | 4 | 5 |
| Someone who understands your problems | 1 | 2 | 3 | 4 | 5 |

| Tangible support | | | | | |
|--|-------------------------|-----------------------------|-------------------------|-------------------------|------------------------|
| Someone to help you if you were confined to bed | 1 | 2 | 3 | 4 | 5 |
| Someone to take you to the doctor if you needed it | 1 | 2 | 3 | 4 | 5 |
| | None of the time | A little of the time | Some of the time | Most of the time | All of the time |
| Someone to prepare your meals if you were unable to do it yourself | 1 | 2 | 3 | 4 | 5 |
| Someone to help with daily chores if you were sick | 1 | 2 | 3 | 4 | 5 |
| Affectionate support | | | | | |
| Someone who shows you love and affection | 1 | 2 | 3 | 4 | 5 |
| Someone to love and make you feel wanted | 1 | 2 | 3 | 4 | 5 |
| Someone who hugs you | 1 | 2 | 3 | 4 | 5 |
| Positive social interaction | | | | | |
| Someone to have a good time with | 1 | 2 | 3 | 4 | 5 |
| Someone to get together with for relaxation | 1 | 2 | 3 | 4 | 5 |
| Someone to do something enjoyable with | 1 | 2 | 3 | 4 | 5 |
| Additional item | | | | | |
| Someone to do things with to help you get your mind off things | 1 | 2 | 3 | 4 | 5 |

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APPENDIX D

THE WESTERN ONTARIO AND MCMASTERS UNIVERSITIES OSTEOARTHRITIS INDEX

Due to copyright regulations, the WOMAC Index instrument cannot be published. To obtain a copy of the instrument refer to the WOMAC Osteoarthritis Index website at: <http://www.womac.org/womac/index.htm>

APPENDIX E

GERIATRIC DEPRESSION SCALE-SHORT FORM

Instructions: Circle the answer that best describes how you felt over the past week.

- | | |
|---|-------|
| 1. Are you basically satisfied with your life? | YesNo |
| 2. Have you dropped many of your activities and interests? | YesNo |
| 3. Do you feel that your life is empty? | YesNo |
| 4. Do you often get bored? | YesNo |
| 5. Are you in good spirits most of the time? | YesNo |
| 6. Are you afraid that something bad is going to happen to you? | YesNo |
| 7. Do you feel happy most of the time? | YesNo |
| 8. Do you feel helpless? | YesNo |
| 9. Do you prefer to stay at home, rather than going out and doing things? | YesNo |
| 10. Do you feel that you have more problems with memory than most? | YesNo |
| 11. Do you think it is wonderful to be alive now? | YesNo |
| 12. Do you feel worthless the way you are now? | YesNo |
| 13. Do you feel full of energy? | YesNo |
| 14. Do you feel that your situation is hopeless? | YesNo |
| 15. Do you think that most people are better off than you are? | YesNo |

Sheikh, J. I., & Yesavage, J. A. (1986). Geriatric depression scale (GDS): Recent evidence and development of a shorter version. *Clinical Gerontologist, 5*, 165-173.

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APPENDIX F

THE QUALITY OF LIFE INDEX-ARTHRITIS VERSION III

Ferrans and Powers
QUALITY OF LIFE INDEX[®]
ARTHRITIS VERSION – III

PART 1. For each of the following, please choose the answer that best describes how satisfied you are with that area of your life. Please mark your answer by circling the number. There are no right or wrong answers.

| HOW SATISFIED ARE YOU WITH: | Very Dissatisfied | Moderately Dissatisfied | Slightly Dissatisfied | Slightly Satisfied | Moderately Satisfied | Very Satisfied |
|---|-------------------|-------------------------|-----------------------|--------------------|----------------------|----------------|
| 1. Your health? | 1 | 2 | 3 | 4 | 5 | 6 |
| 2. Your health care? | 1 | 2 | 3 | 4 | 5 | 6 |
| 3. The amount of pain that you have? | 1 | 2 | 3 | 4 | 5 | 6 |
| 4. The amount of energy you have for everyday activities? | 1 | 2 | 3 | 4 | 5 | 6 |
| 5. Your ability to take care of yourself without help? | 1 | 2 | 3 | 4 | 5 | 6 |
| 6. Your ability to get around, go places? | 1 | 2 | 3 | 4 | 5 | 6 |
| 7. Your ability to do things with your hands and arms? | 1 | 2 | 3 | 4 | 5 | 6 |
| 8. The amount of control you have over your life? | 1 | 2 | 3 | 4 | 5 | 6 |
| 9. Your chances of living as long as you would like? | 1 | 2 | 3 | 4 | 5 | 6 |
| 10. Your family's health? | 1 | 2 | 3 | 4 | 5 | 6 |
| 11. Your children? | 1 | 2 | 3 | 4 | 5 | 6 |
| 12. Your family's happiness? | 1 | 2 | 3 | 4 | 5 | 6 |
| 13. Your sex life? | 1 | 2 | 3 | 4 | 5 | 6 |
| 14. Your spouse, lover, or partner? | 1 | 2 | 3 | 4 | 5 | 6 |
| 15. Your friends? | 1 | 2 | 3 | 4 | 5 | 6 |
| 16. The emotional support you get from your family? | 1 | 2 | 3 | 4 | 5 | 6 |
| 17. The emotional support you get from your friends? | 1 | 2 | 3 | 4 | 5 | 6 |

(Please Go To Next Page)

| HOW SATISFIED ARE YOU WITH: | Very Dissatisfied | Moderately Dissatisfied | Slightly Dissatisfied | Slightly Satisfied | Moderately Satisfied | Very Satisfied |
|---|-------------------|-------------------------|-----------------------|--------------------|----------------------|----------------|
| 18. Your ability to take care of family responsibilities? | 1 | 2 | 3 | 4 | 5 | 6 |
| 19. How useful you are to others? | 1 | 2 | 3 | 4 | 5 | 6 |
| 20. The amount of worries in your life? | 1 | 2 | 3 | 4 | 5 | 6 |
| 21. Your neighborhood? | 1 | 2 | 3 | 4 | 5 | 6 |
| 22. Your home, apartment, or place where you live? | 1 | 2 | 3 | 4 | 5 | 6 |
| 23. Your job (if employed)? | 1 | 2 | 3 | 4 | 5 | 6 |
| 24. Not having a job (if unemployed, retired, or disabled)? | 1 | 2 | 3 | 4 | 5 | 6 |
| 25. Your education? | 1 | 2 | 3 | 4 | 5 | 6 |
| 26. How well you can take care of your financial needs? | 1 | 2 | 3 | 4 | 5 | 6 |
| 27. The things you do for fun? | 1 | 2 | 3 | 4 | 5 | 6 |
| 28. Your chances for a happy future? | 1 | 2 | 3 | 4 | 5 | 6 |
| 29. Your peace of mind? | 1 | 2 | 3 | 4 | 5 | 6 |
| 30. Your faith in God? | 1 | 2 | 3 | 4 | 5 | 6 |
| 31. Your achievement of personal goals? | 1 | 2 | 3 | 4 | 5 | 6 |
| 32. Your happiness in general? | 1 | 2 | 3 | 4 | 5 | 6 |
| 33. Your life in general? | 1 | 2 | 3 | 4 | 5 | 6 |
| 34. Your personal appearance? | 1 | 2 | 3 | 4 | 5 | 6 |
| 35. Yourself in general? | 1 | 2 | 3 | 4 | 5 | 6 |

(Please Go To Next Page)

| HOW IMPORTANT TO YOU IS: | Very Unimportant | Moderately Unimportant | Slightly Unimportant | Slightly Important | Moderately Important | Very Important |
|---|------------------|------------------------|----------------------|--------------------|----------------------|----------------|
| 18. Taking care of family responsibilities? | 1 | 2 | 3 | 4 | 5 | 6 |
| 19. Being useful to others? | 1 | 2 | 3 | 4 | 5 | 6 |
| 20. Having no worries? | 1 | 2 | 3 | 4 | 5 | 6 |
| 21. Your neighborhood? | 1 | 2 | 3 | 4 | 5 | 6 |
| 22. Your home, apartment, or place where you live? | 1 | 2 | 3 | 4 | 5 | 6 |
| 23. Your job (if employed)? | 1 | 2 | 3 | 4 | 5 | 6 |
| 24. Having a job (if unemployed, retired, or disabled)? | 1 | 2 | 3 | 4 | 5 | 6 |
| 25. Your education? | 1 | 2 | 3 | 4 | 5 | 6 |
| 26. Being able to take care of your financial needs? | 1 | 2 | 3 | 4 | 5 | 6 |
| 27. Doing things for fun? | 1 | 2 | 3 | 4 | 5 | 6 |
| 28. Having a happy future? | 1 | 2 | 3 | 4 | 5 | 6 |
| 29. Peace of mind? | 1 | 2 | 3 | 4 | 5 | 6 |
| 30. Your faith in God? | 1 | 2 | 3 | 4 | 5 | 6 |
| 31. Achieving your personal goals? | 1 | 2 | 3 | 4 | 5 | 6 |
| 32. Your happiness in general? | 1 | 2 | 3 | 4 | 5 | 6 |
| 33. Being satisfied with life? | 1 | 2 | 3 | 4 | 5 | 6 |
| 34. Your personal appearance? | 1 | 2 | 3 | 4 | 5 | 6 |
| 35. Are you to yourself? | 1 | 2 | 3 | 4 | 5 | 6 |

PART 2. For each of the following, please choose the answer that best describes how *important* that area of your life is to you. Please mark your answer by circling the number. There are no right or wrong answers.

| | Very Unimportant | Moderately Unimportant | Slightly Unimportant | Slightly Important | Moderately Important | Very Important |
|--|------------------|------------------------|----------------------|--------------------|----------------------|----------------|
| HOW IMPORTANT TO YOU IS: | | | | | | |
| 1. Your health? | 1 | 2 | 3 | 4 | 5 | 6 |
| 2. Your health care? | 1 | 2 | 3 | 4 | 5 | 6 |
| 3. Having no pain? | 1 | 2 | 3 | 4 | 5 | 6 |
| 4. Having enough energy for everyday activities? | 1 | 2 | 3 | 4 | 5 | 6 |
| 5. Taking care of yourself without help? | 1 | 2 | 3 | 4 | 5 | 6 |
| 6. Your ability to get around, go places? | 1 | 2 | 3 | 4 | 5 | 6 |
| 7. Your ability to do things with your hands and arms? | 1 | 2 | 3 | 4 | 5 | 6 |
| 8. The amount of control you have over your life? | 1 | 2 | 3 | 4 | 5 | 6 |
| 9. Your chances of living as long as you would like? | 1 | 2 | 3 | 4 | 5 | 6 |
| 10. Your family's health? | 1 | 2 | 3 | 4 | 5 | 6 |
| 11. Your children? | 1 | 2 | 3 | 4 | 5 | 6 |
| 12. Your family's happiness? | 1 | 2 | 3 | 4 | 5 | 6 |
| 13. Your sex life? | 1 | 2 | 3 | 4 | 5 | 6 |
| 14. Your spouse, lover, or partner? | 1 | 2 | 3 | 4 | 5 | 6 |
| 15. Your friends? | 1 | 2 | 3 | 4 | 5 | 6 |
| 16. The emotional support you get from your family? | 1 | 2 | 3 | 4 | 5 | 6 |
| 17. The emotional support you get from your friends? | 1 | 2 | 3 | 4 | 5 | 6 |

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APPENDIX G

PERMISSION TO USE REVISED WILSON AND CLEARY MODEL FOR HEALTH-RELATED QUALITY OF LIFE

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15. This Agreement shall be governed by and construed in accordance with the laws of England and you agree to submit to the exclusive jurisdiction of the English courts.

16. Other Terms and Conditions:

BY CLICKING ON THE "I ACCEPT" BUTTON, YOU ACKNOWLEDGE THAT YOU HAVE READ AND FULLY UNDERSTAND EACH OF THE SECTIONS OF AND PROVISIONS SET FORTH IN THIS AGREEMENT AND THAT YOU ARE IN AGREEMENT WITH AND ARE WILLING TO ACCEPT ALL OF YOUR OBLIGATIONS AS SET FORTH IN THIS AGREEMENT.

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