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Quality of life following total knee replacement

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QUALITY OF LIFE FOLLOWING TOTAL KNEE REPLACEMENT

A Thesis

Presented to

The Faculty of the School of Nursing
San Jose State University

In Partial Fulfillment
of the Requirements for the Degree
Master of Science

By

Cheryl L. Miller

August, 1993

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ABSTRACT

QUALITY OF LIFE FOLLOWING TOTAL KNEE REPLACEMENT

by Cheryl L. Miller

This retrospective, descriptive study is a replication of a previous study by Selman (1989). The purpose of this study was to investigate quality of life following total knee replacement (TKR) for those persons suffering from osteoarthritis of the knee. The study consisted of 38 subjects who had received TKR 12-24 months earlier at an acute care community hospital in the San Francisco Bay Area. The subjects were predominantly white, married females with an average age of 69 years.

Quality of life following TKR was measured by the subject's perception of change in four areas: physiologic function, self-concept, role function, and interdependence. A modified version of the Arthritis Impact Measurement Scales (AIMS) was the instrument used to collect the data and measure this change. The results most frequently indicated no perceived difference in quality of life regardless of the participant's age. Of the 38 subjects, 65% were very satisfied with having TKR.

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Chapter 1

INTRODUCTION

Thousands of Americans are diagnosed with arthritis every year. Osteoarthritis (OA), the most common form of this disabling disease, affects more than 16 million people in the United States (Arthritis Foundation, 1985). OA is a chronic and painful disease without a known cure. Those who live with the pain day after day search for new forms of treatment to decrease their pain and increase their mobility.

Due to OA's chronicity and associated disabilities, persons with OA struggle to maintain their quality of life. Studies have been conducted to explore the quality of life of those who suffer from arthritis (Burckhardt, 1985, 1988; LaBorde & Powers, 1980). However, relatively few studies have been conducted on the impact treatments have on quality of life for persons with arthritis.

A well known surgical intervention for arthritis, total joint replacement, is an increasingly utilized treatment. However, this treatment does not come without extraordinary cost. More importantly, there is very little data to substantiate this treatment as effective in improving quality of life for persons who elect to have the procedure. Since the ultimate goal of health care is to improve the healthful outcomes of patients, it is appropriate to explore

total joint replacement and its affect on quality of life (Fries, 1983).

Through advances in biomedical technology within the last 20 years, persons whose major joints are destroyed by OA find renewed hope in total joint replacement. The arthritic joint is surgically replaced by durable prosthetic components. The hip and knee joints are the most commonly replaced joints, although joints such as the shoulder and elbow can be replaced as well (Arthritis Foundation, 1983). The cost of these prosthetic components is phenomenal. A typical non-cemented hip or knee prosthesis costs as much as \$7000. Although not a cure for osteoarthritis, total joint replacement is a form of palliation that improves mobility and decreases pain in the diseased joint when successful.

Cure is not a realistic expectation for persons with OA, therefore treatment emphasizes improving the quality of life for those attempting to cope with this disease. Patients hope the surgical correction will enhance their quality of life. When patients elect to have joint replacement, they commit to at least a 6 month rehabilitation phase with the ultimate goal being to improve mobility, function, and pain relief.

It is important to determine if patients feel their quality of life is improved following total joint surgery in relation to how they felt before surgery. The comparative

results have important implications for nurses and other health care professionals responsible for each patient's care. Health professionals must work to develop realistic goals and interventions to enhance quality of life for these patients.

The Problem

Total knee replacement (TKR) has not been in use as long as total hip replacement (THR). The outcomes in relation to pain relief and restored function have not been studied as greatly as total hip replacement (Kelly, 1990). The knee joint is more complex and successful treatment depends greatly on the patient's ability to rehabilitate previously unused muscles to achieve full range of motion in the new joint.

Because the elderly are most commonly stricken with OA (Arthritis Foundation, 1985), they are the most likely candidates to receive TKR. In fact, 75,000 Medicare beneficiaries received the procedure in 1989 (Freund, 1992). Undoubtedly, this treatment will become more popular as the American elderly population continues to increase. Therefore, determining outcomes and their associated costs is a meaningful contribution to contemporary society.

TKR surgery is an expensive, complex procedure. Today, with more emphasis on cost containment and managed care, health care providers are pressured by payers to demonstrate

that treatments are providing quality, cost-effective outcomes for patients (Fries, 1983). Although TKR improves function and diminishes pain, health care cost savings associated with these outcomes are small in the first 6 months after surgery (Liang et al., 1986). However, if it can be demonstrated that quality of life improves after the first 6 months following the surgery, payers such as Medicare, may be more likely to continue reimbursement for the procedure. Conversely, if patients show no change or a decrease in quality of life, health care providers need to re-evaluate this procedure and its effectiveness.

Purpose

The multiple problems facing those with OA include decreased physical function, altered self-concept, inability to perform role functions, and diminished interdependence (Selman, 1989). These factors influence one's perceived quality of life. This study evaluates the relationship between TKR and quality of life as perceived by the osteoarthritic person.

Research Questions

The two research questions are:

1. Does the perception of quality of life change following TKR for discharged patients who suffer from osteoarthritis?

2. Does the perception of quality of life differ among age groups in discharged patients who have had TKR?

Definition of Terms

For the purpose of this study the following definitions apply:

1. Osteoarthritis is a chronic condition which involves breakdown of cartilage and other joint tissues (Arthritis Foundation, 1985).
2. Total knee replacement is surgical remodeling of a diseased knee joint with a metal and plastic prosthesis. An orthopedic surgeon resects the diseased ends of the bones that form the knee joint, the femur and tibia. A prosthesis, made from cobalt chrome and polyethylene, is fitted over the resected ends of the bones (Arthritis Foundation, 1983). The polyethylene functions as the articulating cartilage. The prostheses used for the patients in this study are manufactured by either Howmedica or Intermedics corporations.
3. Quality of life is a person's perception of satisfaction in daily functioning including physiological, role function, self-concept, and interdependence (Roy, 1984).
4. Physical function is the physical demonstration of behaviors necessary to participate in activities of daily life. These activities include the person's ability to

perform self-care activities such as ambulation, exercise, travel, hygiene, dressing, and toileting (Roy, 1984).

5. Self-concept refers to the composite of feelings and beliefs that one holds about oneself. These feelings include selfworth, depression, and perception of health (Roy, 1984).

6. Role function is the characteristic actions of persons within their environment (Roy, 1984). This includes the person's ability to perform activities important to his/her social and vocational roles. Housekeeping responsibilities, financial responsibilities including paying bills and going to the bank are examples of these roles.

7. Interdependence represents a person's relationship with others. This includes the person's willingness and ability to love, share, and value others as well as to respond to love and respect. For example, interdependence involves a person's ability to relate to friends and family at social gatherings (Roy, 1984). This also may include how persons perceive their significant others' feelings.

Summary

Clearly, the impact that OA has on America's aging society is tremendous. The treatments involved in combating this disease are many and varied, but these treatments are forms of comfort that do not cure OA. The most invasive

treatment, total joint surgery, is performed more often now with the increasing availability of sophisticated biomedical technology. However, this technology does not come without extraordinary expense.

The average cost of care for the 6 months prior to total joint replacement is \$933 or more per patient (Liang et al., 1986). The average cost of care during the 6 months after the total joint replacement is \$22,730 per patient (Liang et al., 1986). This cost is almost entirely related to the total joint surgery. Though this cost is phenomenal, as health care providers in the current health care climate, it is important to determine if these costly procedures truly positively affect patients' quality of life.

Flanagan (1978) studied individuals' perceptions of quality of life and found that many subjective factors determine quality of life. Typically, the most common determinants were related to physical and material well-being, relations with people, social, community and civic activities, personal development and fulfillment, and recreation.

In order to justify costly treatment plans, health care providers must realize the impact that treatment procedures have on patients in terms of life activities. This is determined by asking patients their perceptions regarding their own experiences with treatment modalities. It is

imperative to learn what patients believe are the most important factors influencing their quality of life.

Health care providers studying quality of life must consider the individual subjectivity inherent in this type of research. Flanagan's (1978) data reveals that people have differing quality of life values. Nevertheless, there are trends that appear in this data. Health care providers must consider these trends in order to measure a patient's perceived quality of life. These data assist in individualizing patient care. For example, determining a patient's ability to perform a job, go shopping, or relate to family and friends are a few of the ways to measure a person's perceived quality of life. Examining these variables following health care treatments determines if treatments are valuable from a patient's prospective. This information is helpful in planning or creating new interventions and treatments for patients.

Chapter 2

CONCEPTUAL FRAMEWORK AND REVIEW OF LITERATURE

This chapter presents the conceptual framework for the study followed by a review of literature on quality of life, osteoarthritis, and total joint replacement. Roy's Adaptation Model provides a paradigm through which one may view quality of life (Selman, 1989). Within the model, Roy describes specific variables which help to define quality of life. These variables are examined closely as they relate to patients undergoing TKR.

Conceptual Framework

Quality of life is a complex, elusive concept. In order to investigate a persons quality of life, one must determine what constitutes perceived quality of life. Roy's Adaptation Model for Nursing provides an organized view for defining quality of life (Roy, 1984). In this model, nursing care is centered on the promotion of patient adaptation. The nurse positively contributes to the patient's health, quality of life, and death with dignity (Varvaro, 1991).

Although Roy does not specifically define quality of life, she identifies key concepts that influence quality of life. Roy believes that focal and contextual stimuli influence one's adaptation to the environment (Roy & Rogers, 1981). The four modes in which these adaptive responses

occur are physiological, self-concept, role function, and interdependence. The four modes represent the means whereby the person acts on the environment, seeking to maintain or improve his/her level of adequacy as a physiological, psychological, and sociological system (Roy & Roberts, 1981).

"Physiological needs involve the body's basic needs and ways of dealing with adaptation in regard to fluid and electrolytes; exercise and rest; elimination; nutrition; circulation and oxygen; and regulation, which includes the senses, temperature, and endocrine regulation" (Roy & Roberts, 1981, p. 43). Nurses assess patients' physical needs and plan interventions to promote patients' adaptation to their environment from a physiological prospective.

The adaptive mode of self-concept is, "The composite of beliefs and feelings that one holds about oneself at a given time. It is formed from perception, particularly of other's reactions, and directs one's behavior" (Roy & Roberts, 1981, p. 43). The components of self-concept include "the physical self, which involves sensation and body image; and the personal self, which is made up of self-consistency, self-ideal or expectancy, and the moral, ethical self" (Roy & Roberts, 1981, p. 43-44).

"Role function is the performance of duties based on a given position in society. The way one performs a role is

dependent on one's interaction with the other in the given situation" (Roy & Roberts, 1981, p. 44). Nurses orient patients or families to different roles to promote adaptation. For example, the nurse may teach a patient or family member to monitor blood sugar. Hence, the learner develops a care giver role.

"The interdependence mode involves one's relations with significant others and support systems. In this mode one maintains psychic integrity by meeting needs for nurturance and affection" (Roy & Roberts, 1981, p 44). For example, the nurse working with a mother and infant promotes the nurturing relationship. The nurse teaches the mother to recognize and tend to an infant's need for nurturing.

Roy's concepts are applicable to an osteoarthritic patient who is undergoing a TKR. A person experiencing a chronic illness such as arthritis who is faced with major surgery such as TKR is influenced by a number of stimuli both internal and environmental. These stimuli occur at the beginning of the illness and continue through the rehabilitation phase. The patient is faced with limitations which affect physical function, self-concept, role function, and interdependence. Adaptation in these areas are necessary in order to cope with the illness and surgery. The patient's ability to adapt to such stimuli throughout this period of time ultimately influences quality of life.

Review of the Literature

Quality of Life

Researchers in the health professions have discovered that meaningful data can be elicited from patients' perceptions of their quality of life (Burckhardt, Woods, Schulz, & Ziebarth, 1989). In the past, this area was avoided because its measurement was regarded as too difficult. In response to this difficulty, researchers have developed effective instruments to collect such important data (Burckhardt, et al., 1989). Determining how a patient functions in the real world while coping with an illness or treatment is now viewed as highly valuable information. Consequently, quality of life has been studied more and proven to be an increasingly rich area for research.

With the evolution of instruments to collect quality of life data, there have been many studies which propose to evaluate treatments and their effect on quality of life for various patient populations. For example, several studies have focused on the impact of coronary artery bypass graft (CABG) surgery on quality of life (Booth et al., 1991; Caine, Harrison, Sharples, & Wallwork, 1991; Jenkins, Jono, Stanton, & Stroup-Benham, 1990). The common theme inherent in these studies is the search for variables most valuable in determining quality of life.

Jenkins et al. (1990) states there are five orthogonal dimensions to measure in quality of life: low morale, symptoms of illness, neuropsychological function, interpersonal relationships, and economic-employment. He argues that these dimensions can be measured quantitatively with relatively simple interview and questionnaire approaches.

Caine et al. (1991) examined quality of life by assessing CABG patients' health status in terms of functional capacity and aspects of distress. Caine et al. used the Nottingham Health Profile to determine changes in symptoms, working life, and daily activities following the surgery. Caine et al. found improvements were evident in general health state, symptoms, and activity at 3 months and 1 year after CABG surgery. There are commonalities when reviewing the quality of life variables for the Jenkins et al. and Caine et al. studies, but the semantics differ for the actual quality of life factors.

Treatments for various types of cancer have been explored in relation to quality of life. In the past, the primary goal in treatment for cancer patients was to promote survival. However, with the advent of earlier cancer detection and increased treatment modalities, quality of life measures now are viewed as quite useful in planning interventions for cancer patients.

A study by Tannock (1990) measured quality of life for persons with breast cancer and prostate cancer. In this study, quality of life was assessed by the Linear Analog Self Assessment (LASA) scales. The trials examined the relationship between intensity of chemotherapy and therapeutic benefit for metastatic breast cancer. The results indicated there is an improved quality of life for standard dose, continuous chemotherapy as compared to reduced dose or intermittent treatment. This study is important in establishing the palliative value of chemotherapy for treatment of metastatic breast and prostate cancers.

There have been several studies which have addressed quality of life following surgical intervention for cancer. Quality of life was measured in patients who had undergone esophagectomy 3 years earlier (Collard, Ott, Reynaert, & Kestens, 1992). Several variables were used to establish quality of life and alimentary comfort for this population. Current body weight, number of meals per day, major long term complaints such as early fullness during eating, dysphagia, diarrhea, cough-induced vomiting, and postprandial sweating were all used in determining quality of life. Functional data were collected which pertained to employment and lifestyle. From the data collected, it was concluded that most disease-free patients obtain

satisfactory quality of life after esophagectomy. The generalization of these results are greatly cautioned as the sample size of 17 is quite small.

Quality of life after gastrectomy was investigated by interviewing 150 patients with carcinoma of the stomach to determine their quality of life after surgery (Korenaga et al., 1992). Patients ate less and weighed less, but most appeared to be well adjusted and had an optimistic attitude regarding their physical state. According to the researchers, there was no evidence of a diminished quality of life in those who had undergone distal partial gastrectomy. Such items as food tolerance, body-weight, and performance status were examined in order to establish quality of life. Korenaga et al. (1992) postulate that considering the satisfactory outcome and the sustained quality of life, radical gastrectomy may be the treatment of choice for carcinoma of the stomach.

Pain, fatigue, physical symptoms, functional activity, psychological symptoms, and overall physical condition were studied in patients who were treated surgically for head and neck cancer (Jones, Lund, Howard, Greenberg, & McCarthy, 1992). A problem-oriented, self-administered questionnaire was used to collect the data from this population. For data analysis, five groups were identified: laryngectomy, pharyngolaryngoesophagectomy, craniofacial procedure, other

operations, and those with disease recurrence. The data indicate that each group identified different problem areas. Laryngectomies and other operation patients reported relatively few problems, whereas patients with disease recurrence described difficulties in all of the domains examined. Quality of life information is valuable for this patient population in order to facilitate improved rehabilitation interventions.

A life-saving surgical procedure has been explored in relation to quality of life: liver transplant. Two studies found that liver transplant is associated with substantial improvement in life quality (Hicks, Larson, & Ferrans, 1992; Tarter, Switala, Arria, Plail, & Van Thiel, 1992). Despite improvement, patients having liver transplants seldom recover to a normal level of functioning. Two different data collection instruments were used, yet the same basic conclusions were reached for both studies. The instruments were designed to collect valuable quality of life information as it related to this special population.

In measuring quality of life Bell, Bombardier, and Tugwell (1990) assert that functional status, quality of life, and utility measures have developed out of a need to define the effects of health care interventions and the impact of disease on the individual, as well as groups of individuals with chronic disease. One such study examined

quality of life of adults with chronic illness (Burckhardt, Woods, Schultz, & Ziebarth, 1989). Several quality of life instruments were used to collect data from 227 adults diagnosed with chronic illness. The Quality of Life Scale (QOLS), Life Satisfaction Index (LSI), Duke-UNC Health Profile (DUHP), Arthritis Impact Measurement Scales (AIMS) and the Ostomy Adjustment Scale (AOS) were the instruments used to collect the data.

The purpose of the Burckhardt et al. study was to establish greater reliability and validity of these quality of life measures. Stability reliability estimates for all instruments ranged from .53 to .90. Appropriate validity coefficients indicated both convergent and discriminant construct validity for the instruments. Qualitative data from this study indicate that persons with chronic illnesses generate items of importance to their quality of life that are very similar to those generated by persons without chronic illness.

Information provided by quality of life instruments such as those described above are useful in clinical practice for determining prognosis. It also is useful information when identifying current patient problems, defining needs, setting therapeutic priorities, and directing interventions (Bell et al., 1990).

Osteoarthritis and Quality of Life

Important to this study is understanding the characteristics of OA. According to the Arthritis Foundation (1983), every person over 60 years of age has OA to some degree, but only few have it badly enough to notice any symptoms. However, when it does become painful and limits motion, it becomes necessary to seek professional help to prevent or minimize serious joint damage (Arthritis Foundation, 1985). OA may account for more disability among the elderly than any other disease, not because individuals with OA are severely disabled but because the disease is disabling in so many (Felson, 1990). Consequently, the impact of this disease is immense in the elderly population.

Elders are stricken with pain and limited motion in the affected joints. The pain is usually most severe after an unusual increase in activity, making frequent rest periods necessary (Altman, 1990). The exact etiology of OA is unknown. But, there are some predisposing factors such as aging, obesity, and trauma which results in incongruity of joint surfaces (McCarthy, 1979). Pain is the result when there is incongruity of joint surfaces and joint space narrowing. However, these conditions can be corrected through surgical intervention.

Living with OA demands that changes in lifestyle occur. Unwanted lifestyle changes coupled with pain and disability

may produce frustration and dissatisfaction with life. Several studies have been conducted which focus on perceived quality of life and life satisfaction for those with OA. A study by Laborde and Powers (1980) compared satisfaction of life in the elderly with OA and middle-aged persons undergoing hemodialysis by use of Cantril's Self-anchoring Life Satisfaction Scale. Significant in their findings was that persons with OA rate their present state of health lower than the ratings given by dialysis patients. Laborde and Powers attributed the difference to the chronic pain and disability that OA patients experience. Hemodialysis patients are not marked by pain and have the ability to lead a pain free life. Results from this study suggest that decreased pain increases life satisfaction.

A later study by Laborde and Powers (1985) examined life satisfaction, health control orientation, and illness-related factors in persons with OA. They found that the assumptions from their earlier study were congruent with the findings of this study. Pain was found to impinge upon current life satisfaction for some osteoarthritics. However, contrary to the earlier study, salient findings from this report indicate that osteoarthritics rated their overall satisfaction with life and recent health as good.

Burckhardt (1985) explored the impact of pain and functional impairment on persons with arthritis. She found

that positive self-esteem, internal control over health, perceived support and low negative attitude toward illness contributed directly to a higher quality of life. This study illustrates that quality of life is not always related to health factors but is a combination of many factors.

In a later study by Burckhardt (1988), women with arthritis were compared with women without arthritis using Flanagan's Quality of Life Scale. Women with arthritis placed significantly more importance on passive recreational activity and on a close relationship with their spouse or significant other. They were most satisfied with their material comforts, relationships with relatives and close friends, helping and encouraging others, and passive recreation. Nevertheless, women with arthritis were considerably less satisfied with their health, work, and participation in active recreation. These results reiterate that arthritis has detrimental effects on quality of life. However, also inherent in these studies is the complexity associated with quality of life measurement.

Total Joint Replacement

An intervention commonly associated with the treatment of arthritis is total joint replacement. Persons with osteoarthritis need this surgery in order to correct deformity, relieve pain, and improve movement in the affected joint. The hip joint is the most commonly replaced

joint. However, knee joint replacement is becoming an increasingly prescribed treatment for those patients with severe arthritis of the knee. The number of total knee replacements performed annually in this country has risen from less than 10,000 in 1975 to 150,000 in 1990 (Freund, Dittus, Fitzgerald, & Heck, 1990).

Total knee replacement is indicated in the presence of severe pain that is unresponsive to adequate conservative therapy, including nonsteroidal anti-inflammatory medications, intra-articular injections, activity modifications, bracing, and weight reduction (Hungerford & Krackow, 1985). TKR includes the replacement of the tibial plateau, the articulating femoral area, and the patella. Prosthetic components are made of metal alloys such as cobalt chrome and an articulating surface of polyethylene.

Outcomes from the TKR procedure performed in academic medical centers have been reported in the literature (Hungerford & Krackow, 1985; Murray, Gore, Laney, Gardner, & Mollinger, 1983). These outcome measurements deal mostly with such technical outcomes as kinesiology measures and prosthetic alignment. A study by Rousch (1985) did examine functional outcomes associated with elective hip and knee replacements. She surveyed 60 patients who had undergone either hip or knee replacement and found that 65% of the subjects reported no change in their ability to perform 22

activities of daily living. However, the data revealed a significant relationship between psychosocial variables and functional status.

Wiklund & Romanus (1991) measured quality of life before and one year after total hip arthroplasty in 56 patients. The patients assessed quality of life using the Nottingham Health Profile. Significant improvement in pain, energy, sleep, and social isolation was noted. There was a significant reduction in the frequency of health-related problems pertaining to housework, holidays, hobbies, social life, sexual function, and family life. With these positive findings, the researchers concluded that total hip arthroplasty improved quality of life tremendously. They also highly praise the Nottingham Health Profile as a valuable tool in the evaluation of total hip arthroplasty.

An interesting approach was used by O'Boyle, McGee, Hickey, O'Malley, and Joyce (1992) in evaluating quality of life in patients undergoing hip replacement. This novel method measured quality of life from the perspective of the individual patient. Patients were asked to nominate five areas related to functioning which they believed to be important to quality of life. This method was called the Schedule for the Evaluation of Individual Quality of Life (SEIQOL). Traditional methods for determining health status also were applied in this prospective intervention study.

Twenty patients undergoing unilateral total hip replacement surgery were studied 6 months after surgery. They were compared with matched, non-patient controls. The researchers found that health status was significantly improved after hip replacement by use of the McMaster Health Index Questionnaire and the Arthritis Impact Measurement Scales. Individually measured quality of life was significantly improved after surgery when measured by SEIQOL. Implications of this study indicate that self-assessed quality of life variables are highly valuable in determining patients' response to treatment measures.

Summary

Quality of life assessment has been attempted in many patient populations. As demonstrated throughout this chapter, quality of life is becoming increasingly important in understanding the impact of illnesses, diseases, and their treatment. The study of quality of life also is necessary for setting priorities and allocating resources in today's health care environment. Inherent in the literature is the extreme variability in which quality of life can be measured. It can be measured by health status questionnaires, physical exam data, self-assessed quality of life variables, as well as many other specialized variables, which relate to specific patient populations and conditions. Notable in the literature is the lack of quality of life

data present for TKR. Other surgical treatments for chronic illnesses such as cancer and heart disease have been explored in relation to quality of life. An important addition to this body of knowledge would be a study related to TKR and quality of life.

Roy's Adaptation Model provides a framework to better understand the many influences that may effect perceived quality of life. An examination of the quality of life of TKR patients, using the four modes described by Roy, is necessary to provide more information for health care professionals caring for this patient population. This information would assist health care professionals in setting goals, planning interventions, and improving treatments for TKR patients.

Chapter 3

METHOD

This study was developed to determine quality of life following TKR. The study was designed to investigate patients' perceptions in four areas: physiological, self-concept, role function, and interdependence. A written questionnaire was used to gather data from patients who had undergone TKR within 12-24 months prior to the study.

Research Design

A descriptive, retrospective design was selected for this study. This study replicates a study by Selman (1989). Selman examined the impact total hip replacement has on quality of life for persons who suffer from osteoarthritis. This study differs from Selman's in that TKR patients were the target population.

Human Subjects Approval

Human Subjects approval was obtained from the participating hospital (Appendix A) and San Jose State University Institutional Review Boards (Appendix B). There were minimal risks and benefits for those participating in this study. There was no compensation for people participating in the study. The instruments were coded and compared with a list containing the subjects name and address of which only the researcher had access. The purpose for this procedure was to track which questionnaires

had not been returned. As the coded questionnaires were returned they were kept in a locked file.

Subjects and Setting

The sample consisted of patients with osteoarthritis who had undergone TKR at a San Francisco Bay Area hospital. The subjects were randomly selected by computer from the medical records at the hospital. Patients who had undergone TKR 12-24 months earlier (Oct 1990-Oct 1991) were asked to participate in January, 1993. Due to the lengthy rehabilitation phase following surgery it is believed that the impact of the surgery on quality of life may not be realized until that time. The sample included patients from 22 orthopedic surgeons who practice at the hospital. Permission to include their patients in the study was obtained from these surgeons (Appendix C).

Subjects had to meet certain eligibility criteria in order to participate in the study. The range in age was limited to 30-90 years of age. Those with rheumatoid arthritis (RA) were not included because of the complex nature of the disease. Persons with RA often suffer from multi-system problems such as muscle aches, anemia, and deformities. Uncontrolled variables include co morbid conditions and gender.

Fifty-five questionnaires were sent. The final sample consisted of 38 individuals who returned questionnaires,

for a 69% return rate. Demographic data collected included age, gender, race, marital status, educational level, source of employment, years of knee pain, and previous joint surgery. The average age of the subjects was 69.5 years. The 38 subjects included 21 women and 17 men.

Data Collection Procedure

A modified version of the Arthritis Impact Measurement Scales (AIMS), the same instrument that Selman (1989) employed, was used to collect the data from the subjects in this study (Appendix D). The names and addresses of the subjects were obtained from hospital's computerized medical records data bank. The subjects received a phone call from the researcher to inform them of the nature of the study and to ask them to participate. If the subject agreed by phone, they were sent the questionnaire with a cover letter (Appendix D) and a consent form (Appendix E). A self-addressed stamped envelope was included. They were asked to return the questionnaire and consent form within 2 weeks.

Data Collection Instrument

The AIMS questionnaire, a nine-subscale tool developed to measure physical, social, and emotional well-being was used as the data collection instrument. This tool is appropriate for this study because it was specifically designed for persons with arthritis. It also includes physical and psychosocial questions which relate to physical

function, self-concept, role function, and interdependence, the variables which Roy has identified as important in defining quality of life. There are 55 questions on the AIMS; 19 questions address physical function, 13 questions elicit information on self-concept, 6 questions focus on role function, and 4 questions speak to issues around interdependence. There is one question which asks subjects to identify current health or medical problems. The last 10 questions are devised to collect demographic data. There is one open ended question that asks patients to comment on their experience with having a TKR.

Several studies have been conducted to determine reliability and validity of the AIMS (Meenan, Gertman, & Mason, 1980; Meenan, Gertman, Mason, & Dunaif, 1982; Potts & Brandt, 1987). In all studies the AIMS performed well in measuring what it was intended to measure. A reliability test of the AIMS using the test-retest correlation coefficient also has been performed. The minimum value for this measure among the nine AIMS instruments was .84. These reliability results indicate there is little random error in the AIMS questionnaire (Meenan, Gertman, Mason, & Dunaif, 1982).

The validity of the AIMS has been analyzed extensively (Meenan et al., 1980, 1982; Potts & Brandt, 1987). An overall factor analysis used the normalized scores for the

nine component measures. Three discrete factors were identified following rotation and iteration. The first factor had high loadings (0.42-0.81) from the five items that primarily assess physical health status; the second had high and distinct loadings from the psychologic items (0.76-0.89); the third factor had its highest loadings from the pain items. The overall construct validity of the AIMS approach for measuring health status was estimated by the calculation of multiple regression coefficients for the nine scales with the use of four separate dependent variables: global health status, a visual analog measure of arthritis impact, physicians' estimates of functional class, and physicians' estimate of disease activity. The squared multiple correlations coefficients for these four variables were 0.84, 0.75, 0.66, and 0.61, respectively (Meenan, et al., 1982).

Because this study examined changes in patient's perceptions of quality of life after surgery as compared to before surgery, modifications to the instrument were made by Selman (1989). Permission to use the AIMS in its modified form was granted to Selman by Meenan, Gertman, and Mason, the originators of the instrument. This researcher has been granted permission by Selman to use the Modified AIMS in this study (Appendix G). A panel of experts including orthopedic surgeons from the participating hospital were

asked to review the Modified AIMS. Several suggestions for minor changes to the instrument were made.

One question which asked patients to compare their level of vigorous activities before and after surgery was modified to elicit more meaningful data. Most orthopedists restrict total joint patients from doing vigorous activities in order to minimize wear, breakage, and especially loosening of the prosthetic components. The question was changed to ask patients to compare light sporting activities such as cycling, swimming, and walking. Patients are allowed to perform those activities before and after total joint surgery.

Another recommendation by the panel was to add a question regarding the patient's intention to have another total joint replacement in the future. The rationale behind this question was to determine the extent of the patient's OA by determining if there is multiple joint involvement. This question also may indicate perceived satisfaction with the current total joint replacement.

The questionnaire was piloted with three TKR patients who had TKR 12 months earlier. The pilot determined the ease with which the patients were able to understand and answer the questionnaire. The pilot subjects answered the questions without difficulty. However, due to the

modifications of the instrument, caution should be taken in interpretation of results.

Data Analysis

Computerized statistical analysis using the statistical program Statistical Package for Social Sciences (SPSS/PC+) was utilized for data analysis. To measure a change in the four variables, physical function, self concept, role function, and interdependence, each were assessed separately by dividing the questions into four categories. Each category represented one of the four variables. Physical function was represented by 19 questions, 13 questions for self concept, 6 for role function, and 4 for interdependence. A frequency distribution was used to determine the degree of change in the variables.

The questionnaires were scored individually to represent a positive or negative response for each question. Scoring was tabulated by assigning a negative value (-1 or -2) to each question indicating a negative change and a positive value (+1, +2, or +3) to each response indicating a positive change since surgery. Zero was assigned to no change since surgery. Several of the questions on the AIMS questionnaire appeared to have unequal distribution of answers. However, this design was used to allow the subjects more choice in order to get the most appropriate

response. These questions had two responses that meant no change and were scored to reflect this.

Out of the 42 questions designed to measure change, 38 used a scale ranging from -1 to +1. Three questions concerning pain and stiffness were weighted more ranging from -2 to +3 because those factors are typically the most common indicators for having a TKR. Another question examining the subject's perception of health now as compared to before surgery was weighted heavier (-2 to +2). This is justified because perception of health is strongly associated with perceived quality of life (Flanagan, 1978).

The relationship of age and quality of life following TKR was examined. Chi-square was used to determine the statistical relationship between age and physical function, self-concept, role function, and interdependence. The subjects were separated into two equal age groups (ages 51-70 years and 71-86 years) using frequency distribution. The age groups were then tested against each of the four variables using the chi-square statistical measure.

The open ended question which asks subjects to comment on their experience with TKR were separated into two groups: positive and negative. Positive comments were determined by evaluating the use of words such as "pain free", "feeling better", and "doing more activities". Negative comments were identified by words such as "more pain", "feeling

worse", and "able to do less".

Determining the outcomes following TKR using the AIMS instrument allows the researcher to examine many facets of this population's life activities. The AIMS was originally designed to measure 9 sub-components: mobility, physical activity, dexterity, household activities, activities of daily living, anxiety, depression, social activity, and pain. These components are grouped by Selman (1989) and fall into the four modes of Roy's Adaptation Model.

Summary

Findings from this study will add to the body of knowledge associated with arthritis and its treatment. Because of the chronicity and functional disabilities induced by arthritis, understanding this treatment modality's affect on the TKR patient's quality of life will be helpful in setting priorities and health goals for this patient population.

Chapter 4

FINDINGS AND INTERPRETATION

This study was conducted to explore quality of life following TKR. Data were collected through mailed patient surveys. Data analysis was completed to answer the two research questions:

1. Does the perception of quality of life change following TKR for patients who suffer from osteoarthritis?
2. Does the perception of quality of life differ among age groups in patients who have had TKR?

Description of the Sample

Demographic data was collected using the Modified Arthritis Impact Measurement Scales questionnaire. The patient characteristics surveyed included age, gender, race, marital status, educational level, source of employment, years of knee pain, previous joint surgery, and plans for future joint replacement.

For the 38 participants, the range in age was from 51 to 86 years. When divided into age groups, 13% (n=5) were between the ages of 50-59 years, 31% (n=12) were between 60-69 years, 40% (n=15) were between 70-79 years, and 16% (n=6) were between 80-86 years of age. The sample primarily consisted of females, who accounted for 55% (n=21) while 45% (n=17) were males. There was only one non-caucasian participant.

The majority of the subjects were married which represented 61% ($n=23$) of the participants, while 3% ($n=1$) were separated, 11% ($n=4$) were divorced, 21% ($n=8$) were widowed, and 5% ($n=2$) were never married. Thirty four percent ($n=13$) of the subjects had at least 1-4 years of college education and 18% ($n=7$) were college graduates. Similarly, 18% ($n=7$) had graduate or professional education while 24% ($n=9$) were high school graduates and 5% ($n=2$) had education through grades 7-11.

Six time frames were established to determine years of prior knee pain. Forty-five percent ($n=17$) experienced knee pain 0-5 years before surgery, 29% ($n=11$) had knee pain 6-10 years before, 16% ($n=6$) had pain 11-19 years before, 5% ($n=2$) had pain 20-29 years before, 3% ($n=1$) had pain 30-39 years before, and 3% ($n=1$) had knee pain 40-49 years before total knee surgery.

There were 7 subjects who had previous TKR and 2 subjects who had both hips replaced in the past. One other subject had one hip replacement in the past. Twenty-one percent ($n=8$) plan to have the other knee replaced in the future.

Instrument Results

The Modified AIMS, as noted earlier, was the survey instrument used to gather the data. In order to determine the perception of change in quality of life following TKR

a frequency distribution was completed. The four adaptive modes from Roy's Adaptation Model, physical function, self-concept, role function, and interdependence, were the dependent variables studied. Each variable was analyzed separately by grouping the questions into four categories. Each category represented one of the four variables. Scoring was completed by assigning negative values to those answers indicating a negative change since surgery and positive values to those answers indicating a positive change since surgery. A score of 0 was assigned for no change.

Physiologic function was represented by 19 questions. The possible range of scores for physiologic function was -20 to +23. A positive change was indicated in 41% ($n=16$) of the subjects while 50% ($n=19$) indicated no change and 9% ($n=3$) had a negative change.

The self concept variable had a possible range of scores from -14 to +14. This variable was represented by 14 questions. Nineteen percent of the sample reported a positive change, 72% ($n=27$) had no change, and 9% ($n=4$) had a negative change.

The role function variable which was represented by 6 questions had a possible range of scores from -6 to +6. Findings indicate that 26% ($n=10$) of the subjects reported a positive change, 68% ($n=26$) had no change, and 6% ($n=2$) had

a negative change since TKR surgery.

Finally, the interdependence variable was measured by four questions. The possible range of scores was -4 to +4. In measuring this variable it was found that 15% ($n=6$) of the 38 subjects reported a positive change, 80% ($n=30$) had no change, and 5% ($n=2$) had a negative change since TKR.

The chi-square statistic was used to determine the relationship between age and perceived quality of life following TKR. Chi-square was used because the data met the assumptions for this test most accurately. Because the data were categorical in nature, a non-parametric test is preferred (Norusis, 1991). The sample was divided into two age groups. The younger group was comprised of subjects age 51-70 years while the older age group was ages 71-86 years. These age groups were then crosstabulated with the mean results for each of the four variables by use of a 2x2 chi-square table.

The chi-square values for physical function ($X^2=.0003$; $df=1$; $p=.98$), role function ($X^2=.002$; $df=1$; $p=.96$), self-concept ($X^2=2.56$; $df=1$; $p=.11$) and interdependence ($X^2=.317$; $df=1$; $p=.57$) indicated no significant relationships among the age groups tested and the four variables.

One question asked the subjects to rate the level of satisfaction with having a TKR. This question was posed by the use of a Likert scale with "1" representing "very

satisfied" and "5" representing "very dissatisfied". The majority of subjects (65.8%) were very satisfied with the TKR while only 2.6% were very dissatisfied. The rest of the subjects (31.6%) responded somewhere between.

Varied answers were given to an open ended question which asked participants to freely comment regarding their experience with having a TKR. Of the 38 subjects, 25 wrote comments. There were 17 positive comments and 8 negative comments. Examples of the favorable comments follow.

A 64 year old retired operations manager states, "Being pain free, and able to sleep nights, and play golf more often, are well worth the short recuperation time." A 77 year old male retired attorney declared, "Before I could not dance, walk over two blocks, golf, or work in the garden. Now I can dance, walk forever, golf and work in garden without pain or discomfort." Remarks associated with function and leisure activities were evident in those subjects with positive comments.

The persons with negative comments often reported pain and loss of function, such as this statement from a 51 year old senior test operator, "I feel worse now than before. I am hurting and can't go far in walking or being on my feet." Unfortunately, there were other negative remarks such as this one from a 61 year old retired secretary, "I don't feel good. I'm 16 months post operation and I should be doing

better. I've tried everything my doctor said. Nothing seems to work. I'm in pain most of the time--a pain free day is rare." Several patients who had negative comments also were noted to have negative responses in self-concept and interdependence areas. Several patients commented that they were thankful for having the opportunity to express their feelings regarding their experience.

Summary

The statistical results from this study as they relate to the research questions proposed imply that quality of life was not positively changed following TKR for all patients. In addition, there was no significant relationship between age groups and quality of life following TKR.

Chapter 5

DISCUSSION

Summary of Study

The purpose of this study was to investigate quality of life following TKR for persons with osteoarthritis. Roy's four adaptive modes were used to represent quality of life. Again, these modes include physiologic function, self-concept, role function, and interdependence.

In examining the scores from the subjects, the impact of TKR is more positive than negative in the four variables studied by use of the frequency distribution percentages. However, in all areas, the subjects reported no change most often. When comparing the impact of TKR on persons of different age groups by the use of chi-square, there was no statistically significant difference between the younger and older age groups.

The 19 questions representing physical function had interestingly varied answers. The questions which pertained to daily physical activities such as getting in and out of bed, walking, climbing stairs, and bending and lifting showed more positive change than negative or no change. However, those activities which pertained to activities of daily living (taking a bath or shower, tying shoes, getting dressed, and using the toilet), the respondents chose "no change" most frequently. These results indicate that

subjects improved in their ability to physically mobilize themselves. However, in activities that relate to daily hygiene, subjects indicated little change. This is interesting since the knee is used for all of these activities. However, subjects may view hygiene activities as "automatic" no matter what limitations the arthritic knee presented.

There were four questions in the physical function category which related to pain. For the question which asked subjects to compare the amount of knee joint pain now as compared to before TKR, most replied they have less pain now ($n=33$). However, when asked how much severe pain they have now, most replied no change ($n=32$). Upon comparison of these results, one can conclude that most subjects did not have severe pain before or after TKR. However, the level of pain that was present before TKR was improved following the surgery.

For the question which asked for the amount of pain medication taken before TKR as compared to after TKR, most responded "no change" ($n=25$). There were three subjects who took more pain medication. These results indicate that for most subjects TKR did not affect the amount of pain medication taken. However, for the three subjects who took more pain medication, it cannot be concluded that the pain medication increase is directly related to having a TKR or

if there are other health factors which are affecting the increased use of pain medication.

All respondents overwhelmingly noted "no change" most often in all 13 questions related to self concept. Most questions asked respondents to indicate if there was a change in their emotions, such as feeling blue, down in the dumps, or nervous. These results indicate that TKR had little effect on their emotional status. However, one question in the self-concept category asked subjects to indicate how their health is now compared to before the TKR. Only 3 subjects noted a negative change while 22 noted a positive change. Thus, most subjects associated TKR with an improvement in their health status.

There were six questions which related to the role function variable. Again, these responses indicated "no change" most often. Most of these questions related to performing various roles such as housework, shopping, doing laundry, and handling money. The subjects responded in much the same way as they did for the questions which related to hygiene. Although the knee is used in many of these activities, most subjects continued to do them before and after TKR. These results indicate that most subjects continue to complete the activities necessary for their daily role functioning no matter what physical limitations the arthritic knee presented.

The interdependence variable was represented by only four questions. These questions related mostly to "get together" activities with friends and family. Overwhelmingly, the participants indicated no change for this variable. The amount of relating with friends and family was not affected by TKR for most participants.

Conclusions

Considering the statistical results of this study, it is appropriate to conclude that quality of life is not positively impacted by TKR for all individuals. In addition, there is no difference in quality of life according to the age of the subject.

A comparison of these results with Selman's (1989) study of total hip replacement patients yields significantly different findings. Selman found overwhelmingly positive results for the four variables. Her reported findings for positive change in physiologic function, self-concept, role function, and interdependence were 94%, 75%, 83%, and 46% respectively. Selman's research design was much the same as this study. However, her sample size was 46, a slightly larger sample size than this study's sample size.

An explanation for the difference in results may be a variation in the patient populations motivation for rehabilitation. As noted, the knee joint is much more complex than the hip joint and the success of the procedure

depends greatly on the patient's ability to rehabilitate the new joint, surrounding tissue, and muscle.

When comparing age and the four variables, Selman found a weak negative relationship between age and interdependence. The older respondents showed less impact on their interdependent relationships with other people after having a THR than did the younger groups. Selman attributes this difference to either unchanging group living arrangements, or a general decline in social activity with advancing age. This assumption does not apply in this study since there was not significant difference in age groups for the four variables. However, the lack of significance between age groups and the four variables is an important finding.

One might expect that an older person may have difficulty achieving an increased level of functioning following a major surgery due to the increasing incidence of co morbid conditions and frailty. The results of this study do not support this expectation since the younger subjects were no more positively impacted by TKR than the older subjects.

The question which asked subjects to indicate their level of satisfaction with having had TKR was answered quite positively (65.8%) by the sample population. Still, 31.6% answered between very satisfied and very dissatisfied.

Selman's sample answered more positively with 80% indicating very satisfied and only one subject indicating very dissatisfied.

It is difficult to understand why most respondents indicated they were very satisfied with having a TKR yet the answers to the questions indicating change were not overwhelmingly positive. As indicated earlier, the questions in which respondents most positively responded related to decreased pain and increased physical mobility. Deficits in these areas are when TKR is most indicated. Therefore, because these areas were most positively affected, TKR for most people in this sample did offer an improvement in pain and physical mobility.

Considering the results of this study and the problem of cost that was introduced earlier, it is important to establish the benefit to the patient that this procedure affords. If the patient's quality of life is not significantly improved following such a procedure, it is the health care community's responsibility to evaluate the cost and benefit of the procedure.

Health care professionals have an important role in caring for this patient population. These results are significant specifically for orthopedic nurses who work with TKR patients. These nurses now have a basis for motivating patients to comply with rehabilitation strategies. The

nurse also must be aware of behaviors indicating impaired physiologic function, self-concept, role function, and interdependence. Upon identifying such behaviors nurses can plan appropriate interventions in these areas to foster adaptation.

Scope and Limitations

A limiting factor inherent in this study was the inability to control certain variables which may have significantly affected the results. The medical community has well established data suggesting there are negative factors which contraindicate TKR. These negative factors include obesity, youth, extreme age, high-risk medical status, pathologic osteoporosis, and moderately high activity levels (Hungerford & Krackow, 1985). Obviously, these factors are associated with one's ability to recover from TKR, thus impacting perceived quality of life.

The sample for this study was quite homogenous. The range in age was not great (51-86 years) and the racial background of all participants was primarily caucasian ($n=37$). The sample size was somewhat small ($n=38$) and all participants were from the same small geographical area. All of these factors limit generalizability of the results.

The data collection tool for this study may have severely limited accurate responses from subjects. The Modified AIMS asks patients to recall how they felt 1-2

years ago in order to measure change. Difficulty recalling perceptions may have been the reason that most responded "no change" to the questions intended to measure change.

Although the original AIMS has had extensive validity and reliability testing, the modified AIMS has not. This is a definite limitation to this study. The modified AIMS has not been proven to measure what it is intended to measure. Consequently, generalizations of the results are cautioned.

Recommendations

On the basis of this study's findings and conclusions, the following recommendations are made:

1. A prospective study, based on the same theoretical framework, be conducted on a larger, more heterogeneous population, should be completed. Data collection related to quality of life should be collected immediately before TKR then 6 months, 1 year and 2 years later.
2. A similar prospective study as described above should be completed for persons suffering from rheumatoid arthritis. This would provide comparative results between the two arthritis populations.
3. A study to establish reliability and validity of the Modified AIMS instrument.

Although quality of life was not significantly improved for all TKR patients in this study, several interesting findings are meaningful for health care providers. Since

the results of the study found an increase in mobility and a decrease in pain for most patients following TKR, the implications are important for health care providers in planning care for this patient population. Planning interventions to encourage patients to actively cooperate with rehabilitation programs is imperative.

The lack of positive change in self-concept, role function, and interdependence leads one to believe that perhaps these variables are not significantly impacted because subjects may not have felt negatively in these areas before surgery. This notion leads one to question, "What comprises perceived quality of life?" Additional study in the area of quality of life will lead health care professionals into the future in determining which procedures truly make a difference in patients' lives.

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APPENDIX A

Protocol Approval from the
Participating Institution

October 30, 1992

Cheryl Miller, R.N.

2500 Grant Road
Mountain View, California 94040

RE: QUALITY OF LIFE FOLLOWING TOTAL KNEE REPLACEMENT

Dear Ms. Miller:

The above-noted protocol has been approved following expedited review of the information provided concerning the process of the investigation and the current assessment of risks, benefits and the appropriateness of the approved consent form.

The Board's continued approval is contingent on the following:

1. Your use of the approved consent form, a copy of which must be placed on each patient's chart.
2. Your compliance with the approved investigational plan.
3. Your commitment to notify the Board of any unforeseen risks or complications that might reasonably have an effect on the Board's continued approval of study.

After review of the protocol, it should be stressed that you use appropriate statistical analyses. Furthermore, you should probably acknowledge the difficulty of a retrospective study in drawing any conclusions.

The Board has scheduled this study for re-evaluation one year from the date of this approval.

Sincerely,

Michael S. Greenfield, M.D.
Chairman, Institutional Review Board

MSG/ae

APPENDIX B

Letter of Permission

to Conduct Research from

the Human Subjects Institutional Review Board

Office of the Academic Vice President • Associate Academic Vice President • Graduate Studies and Research
One Washington Square • San Jose, California 95192-0025 • 408/924-2480

To: Cheryl Miller

Los Altos, CA 94022

From: Serena W. Stanford *Serena W. Stanford*
AAVP, Graduate Studies and Research

Date: December 17, 1992

The Human Subjects-Institutional Review Board has approved your request to use human subjects in the study entitled:

"Quality of Life Following Total Knee Replacement"

This approval is contingent upon the subjects participating in your research project being appropriately protected from risk. This includes the protection of the anonymity of the subjects' identity when they participate in your research project, and with regard to any and all data that may be collected from the subjects. The Board's approval includes continued monitoring of your research by the Board to assure that the subjects are being adequately and properly protected from such risks. If at any time a subject becomes injured or complains of injury, you must notify Dr. Serena Stanford immediately. Injury includes but is not limited to bodily harm, psychological trauma and release of potentially damaging personal information.

Please also be advised that each subject needs to be fully informed and aware that their participation in your research project is voluntary, and that he or she may withdraw from the project at any time. Further, a subject's participation, refusal to participate or withdrawal will not affect any services the subject is receiving or will receive at the institution in which the research is being conducted.

If you have questions, please contact me at 408-924-2480.

CC: Terry Miller

APPENDIX C
Permission Letter to Physicians

Dear Doctor,

As a requirement for a Master's in Nursing degree, I am conducting a study on patients who have had total knee replacements at El Camino Hospital within the last 12-24 months. With your permission, I may be sending a questionnaire to one or several of your patients. The design of the study is descriptive in nature. I wish to examine the osteoarthritic's perceived quality of life following total knee replacement as compared to before the surgery.

I have enclosed a copy of the modified AIMS instrument which I will use to gather the data. The AIMS will elicit information regarding physical function, self-concept, role function and interdependence. These variables have been associated with perceived quality of life.

The patients' as well as your confidentiality will be protected. The results of this study may be published. However, any information from this study that could be associated with a specific patient or doctor will remain strictly confidential.

If there are any questions regarding this study please contact me. Complaints about the procedures may be presented to Terry Miller, PhD, RN (408)924-3171. If you would prefer your patients not be included in this study please notify me within the next two weeks.

Thank You,

Cheryl Miller, MSc, RN

APPENDIX D

Modified Arthritis Impact Measurement Scales

Data Collection Tool

Modified Arthritis Impact Measurement Scales

Instructions: Please answer the following questions about the way your total joint replacement has affected your life. Put a check by the most appropriate answer. Try to answer every question.

1. Compared to before your joint replacement, how often does someone have to assist you when you are traveling around your community?

☐ More often now.
☐ Less often now.
☐ About the same amount of time.
2. Compared to before your joint surgery, how able are you now to use public transportation?

☐ More often now.
☐ Less often now.
☐ About the same as before.
3. Compared to before your joint surgery, how much of the time do you stay indoors?

☐ More often now.
☐ Less often now.
☐ About the same amount of time as before surgery.
4. Compared to before surgery, how much of the time are you in bed or a chair?

☐ More often now.
☐ Less often now.
☐ About the same amount of time as before surgery.

5. Compared to before your joint surgery, how much difficulty would you have now participating in light sporting activities such as cycling, swimming and walking?
- ☐ More difficulty now.
☐ Less difficulty now.
☐ No change - No difficulty.
☐ No change - Still unable to do.
6. Compared to before your joint surgery, how much difficulty do you have now either walking several blocks or climbing a few stairs?
- ☐ More difficulty now.
☐ Less difficulty now.
☐ No change - No difficulty.
☐ No change - Still unable to do.
7. Compared to before your joint surgery, how much difficulty do you have either climbing one flight of stairs or walking one block?
- ☐ More difficulty now.
☐ Less difficulty now.
☐ No change - No difficulty.
☐ No change - Still unable to do.
8. Compared to before your joint surgery, how much difficulty do you have bending, lifting or stooping?
- ☐ More difficulty now.
☐ Less difficulty now.
☐ No change - No difficulty.
☐ No change - Still unable to do.
9. Compared to before your joint surgery, how able are you now to walk without assistance by another person or by a cane, crutches or braces?
- ☐ More able now.
☐ Less able now.
☐ About the same as before.

10. Compared to before your joint surgery, how much difficulty do you have taking a bath or shower?
- ☐ More difficulty now.
☐ Less difficulty now.
☐ No change - No difficulty.
☐ No change - Still unable to do.
11. Compared to before your joint surgery, how much difficulty do you have tying a pair shoes?
- ☐ More difficulty now.
☐ Less difficulty now.
☐ No change - No difficulty.
☐ No change - Still unable to do.
12. Compared to before your joint surgery, how much help do you need in getting dressed?
- ☐ More help now.
☐ Less help now.
☐ No change - No difficulty.
☐ No change - Still unable to do.
13. Compared to before your joint surgery, how much help do you need to use the toilet?
- ☐ More help now.
☐ Less help now.
☐ No change - No difficulty.
☐ No change - Still unable to do.
14. Compared to before your joint surgery, how well are you able to move around?
- ☐ Better now.
☐ Worse now.
☐ No change - No difficulty.
☐ No change - Unable to move around.

15. Compared to before your joint surgery, how much pain do you have in that joint now?
- ☐ A lot more pain.
 - ☐ A little more pain.
 - ☐ About the same amount of pain.
 - ☐ A little less pain.
 - ☐ A lot less pain.
 - ☐ No pain.
16. Compared to before your joint surgery, how often do you experience severe pain in your knee.
- ☐ More often now.
 - ☐ Less often now.
 - ☐ No change.
 - ☐ No severe pain.
17. Compared to before your joint surgery, how long does your morning stiffness in that joint usually last?
- ☐ Longer now.
 - ☐ Not as long now.
 - ☐ No change.
 - ☐ No morning stiffness.
18. Compared to before your joint surgery, how often do you experience pain in two or more joints at the same time?
- ☐ More often now.
 - ☐ Less often now.
 - ☐ No change.
 - ☐ No pain in two or more joints.

CONSIDERING YOU HAD THE NECESSARY
TRANSPORTATION:

19. Compared to before your joint surgery, how much help do you need to go shopping for groceries or clothes?
- ☐ More help now.
 - ☐ Less help now.
 - ☐ About the same amount of help as before surgery.

CONSIDERING YOU HAVE A KITCHEN:

20. Compared to before your joint surgery, how much difficulty would you have in preparing your meals?

☐ More difficulty now.
☐ Less difficulty now.
☐ No change - No difficulty.
☐ No change - Still would be unable to prepare meals.

CONSIDERING YOU HAD HOUSEHOLD TOOLS AND APPLIANCES (VACUUM, MOP, ETC.):

21. Compared to before your joint surgery, how much difficulty would you have doing your own housework?

☐ More difficulty now.
☐ Less difficulty now.
☐ No change - No difficulty.
☐ No change - Still unable to do.

CONSIDERING YOU HAD LAUNDRY FACILITIES:

22. Compared to before your joint surgery, how much difficulty would you have doing your own laundry?

☐ More difficulty.
☐ Less difficulty.
☐ No change - No difficulty.
☐ No change - Still unable to do.

23. Compared to before your joint surgery, how much help do you need in handling money (Paying bills, going to the bank, etc.)?

☐ Less help now.
☐ More help now.
☐ No change - No difficulty.
☐ No change - Still unable to do.

24. Compared to before your joint surgery, how much time does your joint keep you from doing the kinds of things that you should be able to do?
- ☐ More of the time now.
☐ Less of the time now.
☐ No change - All of the time now.
☐ No change - None of the time now.
25. Compared to before your joint surgery, how often do you get together with friends and family?
- ☐ More often now.
☐ Less often now.
☐ About the same as before.
26. Compared to before your joint surgery, how often do you have friends and family over to your house?
- ☐ More often now.
☐ Less often now.
☐ About the same as before.
27. Compared to before your joint surgery, how often do you leave your house to visit friends and family?
- ☐ More often now.
☐ Less often now.
☐ About the same as before.
28. Compared to before your joint surgery, how often are you on the phone with close friends or family?
- ☐ More often now.
☐ Less often now.
☐ About the same as before.
29. Compared to before your joint surgery, how much of the time do you feel tense or "high strung"?
- ☐ More of the time now.
☐ Less of the time now.
☐ No change - Most of the time.
☐ No change - Hardly any of the time.

30. Compared to before your joint surgery, how much of the time do you enjoy the things that you do?
- ☐ More of the time now.
☐ Less of the time now.
☐ No change - Most of the time.
☐ No change - Hardly any of the time.
31. Compared to before your joint surgery, how much of the time are you bothered by nervousness or your "nerves"?
- ☐ More of the time now.
☐ Less of the time now.
☐ No change - Most to the time.
☐ No change - Hardly any of the time.
32. Compared to before your joint surgery, how much of the time are you in low or very low spirits?
- ☐ More of the time now.
☐ Less of the time now.
☐ No change - Most of the time.
☐ No change - Hardly any of the time.
33. Compared to before your joint surgery, how much of the time do you find yourself having difficulty trying to calm down?
- ☐ More often of the time now.
☐ Less of the time now.
☐ No change - Most of the time.
☐ No change - Hardly any of the time.
34. Compared to before your joint surgery, how much of the time do you feel relaxed and free of tension?
- ☐ More of the time now.
☐ Less of the time now.
☐ No change - Most of the time.
☐ No change - Hardly any of the time.

35. Compared to before your joint surgery, how much of the time do you feel downhearted and blue?
- ☐ More of the time now.
☐ Less of the time now.
☐ No change - Most of the time.
☐ No change - Hardly any of the time.
36. Compared to before your joint surgery, how much of the time do you feel that nothing turns out the way you want it to?
- ☐ More of the time now.
☐ Less of the time now.
☐ No change - Most of the time.
☐ No change - Hardly any of the time.
37. Compared to before your joint surgery, how much of the time do you feel calm and peaceful?
- ☐ More of the time now.
☐ Less of the time now.
☐ No change - Most of the time.
☐ No change - Hardly any of the time.
38. Compared to before your joint surgery, how often do you feel that others would be better off if you were dead?
- ☐ More of the time now.
☐ Less of the time now.
☐ Have never felt this way.
☐ No change - Most of the time.
☐ No change - Hardly any of the time.
39. Compared to before your joint surgery, how much of the time are you able to relax without difficulty?
- ☐ More of the time now.
☐ Less of the time now.
☐ No change - Most of the time.
☐ No change - Hardly any of the time.

- ☐ More of the time now.
☐ Less of the time now.
☐ No change - Most of the time.
☐ No change - Hardly any of the time.

41. Compared to before your joint surgery, how would you say your health is now?

- ☐ A lot better now.
- ☐ Better now.
- ☐ About the same as before.
- ☐ Worse now.
- ☐ A lot worse now.

42. Compared to before your joint surgery, how much pain medication do you take for your joint pain?

- ☐ More medication now.
☐ Less medication now.
☐ The same amount as before.
☐ No change - do not take any medication.

43. Considering the limitations you had before your joint surgery and the time it has taken you to recuperate, mark on the scale how satisfied you are with having a total joint replacement. Circle the most appropriate mark.

1 2 3 4 5
Very Very
Satisfied Dissatisfied

Please feel free to add comments concerning your experience after having joint surgery.

44. Is your health currently affected by any of the following medical problems?
(Please circle YES or NO for each one.)

High blood pressure	Yes	No
Heart disease	Yes	No
Mental Illness	Yes	No
Diabetes	Yes	No
Cancer	Yes	No
Alcohol or Drug abuse	Yes	No
Lung disease	Yes	No
Kidney disease	Yes	No
Liver disease	Yes	No
Stomach disease	Yes	No
Blood disease	Yes	No

PLEASE PROVIDE THE FOLLOWING INFORMATION ABOUT YOURSELF:

45. What is your age at this time_____
46. How many years had you had joint pain prior to your surgery?_____
47. What is your sex? ____Female ____Male
48. What is your racial background?
- ____White
____Black
____Hispanic
____Oriental or Pacific Islander
____American Indian or Native American
____Other
49. What is your current marital status?
- ____Married
____Separated
____Divorced
____Widowed
____Never Married
50. What is your occupation? (indicate student, housewife, disabled, retired, unemployed, if appropriate).
- _____
51. If you are retired, disabled or unemployed, what was your previous occupation?
- _____

52. Have you ever had another total joint replacement?

☐ Yes
☐ No

53. If you have, when was the joint replacement?

Which joints _____

54. Do you plan to have another joint replacement in the future?

☐ No ☐ Yes

If yes, which joint? _____

55. Please check the highest level of education you received.

☐ Professional or graduate school
☐ College graduate
☐ One to four years of college
☐ High school graduate
☐ Grades 7 - 11
☐ Less than 7 years of school

APPENDIX E
Cover Letter to Subjects

Dear Patient,

I hope you have recovered well from the total knee replacement surgery you had at El Camino Hospital. I called you a few days ago to tell you I'd be sending you this questionnaire.

I am doing a special study to determine if your total knee replacement has made any difference in your life.

Enclosed you will find a survey which asks questions regarding your health and activities of daily living. Please take about 20 minutes to complete it. Your truthful responses would be greatly appreciated in evaluating if the total knee replacement has made a change for you.

Your responses will be kept strictly confidential. In no way will your responses be identified with yourself or your doctor. Please understand that your participation is voluntary and that choosing not to participate in this study will not affect your relations with San Jose State University or the hospital.

There are minimal risks and benefits for participating in this study. You will not be compensated for participating in this study.

The results of this study may be published, but any information that could result in your identification will remain confidential.

Two self-addressed, postage paid envelopes are enclosed. Please return the consent form in one envelope and the completed questionnaire in the other. This procedure is to assure confidentiality. Please return your survey within two weeks so that this study can be completed in a timely manner.

Sincerely,

Cheryl Miller, MSc, RN

APPENDIX F
Consent Form

AGREEMENT TO PARTICIPATE IN RESEARCH
SAN JOSE STATE UNIVERSITY

Responsible Investigator: Cheryl L. Miller

Title of Protocol: Quality of Life Following Total Knee
Replacement

I have been asked to participate in a research study that is investigating my perceived quality of life following total knee replacement.

I understand that:

- 1) I will be asked to fill out and return a questionnaire of under 60 questions that has been mailed to me approximately 12-24 months following my total knee replacement.
- 2) No anticipated risks are expected as a result of participating in this study.
- 3) There are no benefits to me from participating in this study.
- 4) No treatments will be withheld as a result of participating or not participating in this study.
- 5) The results of this study may be published, but any information from this study that can be identified with me will remain strictly confidential.
- 6) There will be no compensation as a result of participation in this study.
- 7) Any questions about my participation in this study will be answered by Cheryl Miller, RN at (415)940-7120. Complaints about the procedures may be presented to Terry Miller PhD, RN, (408)924-3137 or the Medical Staff Office at El Camino Hospital (415)940-7040. For questions or complaints about research subject's rights, or in the event of research-related injury, contact Serena Stanford PhD (Associate Academic Vice President for Graduate Studies & Research) at (408)924-2480.
- 8) No service of any kind that I may otherwise be entitled to will be lost or jeopardized if I choose not to participate in this study.
- 9) My consent is given voluntary; I may refuse to participate in this study or in any part of this study, and I may withdraw at any time without prejudice to my relations with SJSU or El Camino

Hospital.

10) I have received a copy of this consent form.

I HAVE MADE A DECISION WHETHER OR NOT TO PARTICIPATE. MY SIGNATURE INDICATES THAT I HAVE READ THE INFORMATION PROVIDED ABOVE AND THAT I HAVE DECIDED TO PARTICIPATE.

THE SIGNATURE OF THE RESEARCHER ON THIS DOCUMENT INDICATES AGREEMENT TO INCLUDE THE ABOVE NAMED SUBJECT IN THE RESEARCH AND ATTESTATION THAT THE SUBJECT HAS BEEN FULLY INFORMED OF HIS OR HER RIGHTS.

Subject's signature

Date

Investigator's signature

Date

APPENDIX G

Letter of Permission for Use of Modified AIMS

Cheryl -

so sorry for the delay
in getting this to you. I
hope it is helpful to
you. Please let me know
if I can be of any
further assistance.

Sincerely,

Susan Seaman

P.S. the Original AIMS tool
came from: Multipurpose
Arthritis Center
Health Services Research On
BU School of Medicine, K-12
71 East Concord St.
Boston, MA 02118