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Utilization of ambulatory
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Osteoarthritis (OA) is one of the most frequent causes of physical disability among the adult population. It is estimated that more than 20 million people in the United States have osteoarthritis and more than 50% of those 65 and older have evidence of the disease. The debilitating effects of the disease are responsible for more than 7 million physician visits annually. In fact osteoarthritis accounts for more hospitalizations than rheumatoid arthritis each year. Treatment costs to the patients, healthcare expenditures, increasing prevalence of the diseases, and its effect on disability are all major public health issues. The purpose of this research is to identify characteristics as they relate to the type of ambulatory visits and the therapeutic services provided. Factors to be considered include: age, gender, race, ethnicity and source of payment for services. Data will be obtained from the National Ambulatory Medical Care Survey (NAMCS) and the National Hospital Ambulatory Medical Care Survey (NHAMCS) of 1998. Information obtained from this research may influence future public health decisions regarding education, treatment and management of chronic conditions such as osteoarthritis.

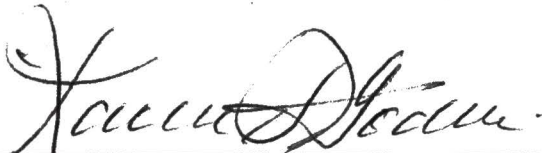
UTILIZATION OF AMBULATORY CARE FOR
OSTEOARTHRITIS TREATMENT, 1998

Latunya N. Davidson, B.S.

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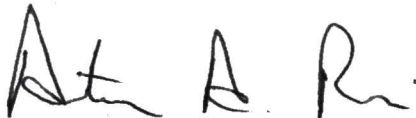
Major Professor



Committee Member



Committee Member



Track Director



Dean, School of Public Health

**UTILIZATION OF AMBULATORY CARE FOR
OSTEOARTHRITIS TREATMENT, 1998**

THESIS

**Presented to the School of Public Health
University of North Texas
Health Science Center at Fort Worth
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Master of Public Health

By

Latunya N. Davidson, B.S.

Fort Worth, Texas

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CHAPTER 1

INTRODUCTION

Background

Osteoarthritis (OA) is one of the most frequent causes of physical disability among the adult population. It is estimated that more than 20 million people in the United States have osteoarthritis and more than 50% of those 65 and older have evidence of the disease (National Institute of Health, 2000). Osteoarthritis, one of the oldest and most common forms of arthritis, is characterized by the degeneration of joint cartilage. The debilitating effects of the disease are responsible for more than 7 million physician visits annually (Arthritis Foundation, 2000). In fact osteoarthritis accounts for more hospitalizations than rheumatoid arthritis each year (Cooper, 1995).

Osteoarthritis is a major health issue facing the public in the new millennium. Treatment costs to the patients, healthcare expenditures, increasing prevalence of the diseases, and its effect on disability are all major issues. The purpose of this investigation is to identify characteristics as they relate to the type of ambulatory visits and the therapeutic services provided. Factors to be considered include: age, gender, race, ethnicity and source of payment for services. Data will be obtained from the National Ambulatory Medical Care Survey (NAMCS) and National Hospital Ambulatory Medical Care Survey (NHAMCS) of 1998. Information obtained from this research may

influence future public health decisions regarding education, treatment and management of chronic conditions such as osteoarthritis.

Therapeutic approaches to osteoarthritis can vary. Some treatment strategies range from the most benign such as a prescription for exercise to the most invasive form, surgery. Other methods include weight control, use of medicines and use of alternative forms of treatment such as acupuncture. The ultimate goal in the treatment of osteoarthritis patients is to decrease pain and increase function. In 1992 musculoskeletal conditions such as osteoarthritis costs the US \$65 billion dollars in direct expenses and lost wages (Arthritis Foundation, 2000). Estimated costs of osteoarthritis alone are \$15.5 billion annually. This is 3 times greater than that of rheumatoid arthritis (Felson & Zhang, 1998).

Objectives

The primary objectives of this research are to 1) identify the demographic characteristics (age, gender, race, and ethnicity) and expected source of payment of osteoarthritis patients who use ambulatory care services for treatment and 2) identify the therapeutic services (medications prescribed, procedures performed) most associated with each ambulatory care location (hospital outpatient, physicians office or emergency department). Different methods of treatment for osteoarthritis may suggest different outcomes based on individual patient characteristics (Burt & Knapp, 1996).

The hypotheses to be tested are:

- H_0 : Patient demographic characteristics (age, gender, race, and ethnicity) and expected source of payment are independent of services provided by hospital

(emergency and outpatient departments) and physicians office ambulatory settings.

- H_A: Patient demographic characteristics are not independent of services provided by ambulatory care facilities.

Significance

Several studies have identified disparities in the utilization of ambulatory care for both asthma and gynecologic conditions based on certain patient characteristics.

Underutilization of ambulatory services can affect the quality of treatment received by certain groups of people. Little is known about differences in treatment of those who have osteoarthritis. Osteoarthritis sufferers, like many other chronic disease patients, seek the best therapy for managing the painful effects of their disease. Disease manageability can also be improved by providing a better quality of life for patients.

With the projected estimate of arthritis sufferers and other rheumatic conditions at 60 million by the year 2020, public health professionals should determine the most effective treatments for all patients (Center for Disease Control, 2000).

The significance of ambulatory care facilities is to provide healthcare services to the public. Some of these services may include surgical procedures, prescriptions for medications, counseling on prevention, and disease management. In the case of osteoarthritis, patients who do not have access to ambulatory care facilities may miss opportunities to receive adequate treatment for their chronic illness. Limited evidence exists that provides insight into whether there is a correlation between the type of ambulatory service provided (hospital outpatient, physician office, emergency room) and

the treatment provided at the time of service. This study examines which patients are visiting ambulatory care facilities and what types of treatments are provided at those visits.

CHAPTER 2

REVIEW OF THE LITERATURE

Definition

Osteoarthritis is the most common form of arthritis and one of the most common diseases in the world. (Kirwan & Quilty, 1999) It is characterized by the degeneration of joint cartilage, the elastic tissue that covers the ends of bones. As the surface layers of cartilage break down, the bones at the joint rub together causing pain and limited movement (National Institute of Health, 2000). Classification of the definition of osteoarthritis is based on radiological, symptomatic, and clinical evidence (Cooper, 1995). Radiographic changes, originally described by Kellgren and Lawrence in the 1950s, are most often used in diagnosing the disease. These changes are evident in radiographs that assess the degree of cartilage loss and bony changes of the joint. Symptomatic disease classification varies among individuals, however, the most common signs reported include pain, stiffness, swelling, restricted range of motion, and deformity in the affected area. Many patients with radiographic evidence are asymptomatic. Clinical classification of osteoarthritis combines both radiographic features and symptoms to define cases (Felson & Zhang, 1998).

Risk Factors

The most common risk factor for the development of osteoarthritis is age. In Western populations, radiographic evidence of the disease is present in a majority of people 65 year olds, and in nearly 80% of those 75 years of age and over (Cooper, 1995). A community-based survey illustrated that incidence and prevalence increased 2- to 10-fold from age 30 to 65 years (Oliveria, 1995). The biological changes associated with aging include a decrease in the elasticity of ligaments around the joints and a decrease in the ability for cells to stimulate repair. These changes make the joints more vulnerable to injury and less responsive to the healing process (Felson & Zhang, 1998). Therefore, it is expected that the prevalence of osteoarthritis will be at a continual increase as the aging population increases.

There is also evidence of sex-specific differences in patterns of the disease. Most recent findings suggest that the prevalence of osteoarthritis in most joints is higher in men than women before the age of 50. However, after age 50, women are more often affected in specific areas of the hand, knee, and foot (Jordan et al., 2000). The differences in sex-related patterns of developing osteoarthritis have been associated with estrogen deficiency in women just after menopause. This evidence suggests that estrogen may act as a protective effect for the development of osteoarthritis (Creamer & Hochberg, 1997).

Conflicting evidence exists concerning the association of osteoarthritis and race/ethnicity. Most studies have compared rates of the disease among blacks and whites. While the National Health and Nutrition Examination Survey I (NHANES I) suggests higher rates of knee osteoarthritis in black women, the Johnston County Osteoarthritis Project suggested no differences in disease prevalence (Jordan et al., 2000).

Among other populations, the rates of the development of the disease need further research. Limited data are available on the prevalence of all cases of arthritis within the Hispanic population. However, studies show that recipients of hip replacements in the US are less likely to be Hispanic as compared to others with similar access to health care (Escalante, Espinosa-Morales, Rincon, Arroyo, & Older, 2000). This is also evident in the Asian population in the US. The rate of hip replacements is lower in Asians than in whites indicating Asians may have a lower prevalence of developing hip abnormalities (Felson & Zhang, 1998).

There are other systemic and biomechanical factors associated with the risks of developing osteoarthritis. Systemic risk factors include bone density, genetic factors, and nutritional factors related to lack of vitamin intake. One of the most significant biomechanical factors associated with osteoarthritis is obesity. This is especially evident in osteoarthritis of weight bearing joints of the knee. For women, the weight factor accounts for more cases of osteoarthritis than the other known factors (Felson, 1995). The Framingham Study reported that women who lost an average of 11 lbs decreased their risk of developing knee osteoarthritis by 50% (Jordan et al., 2000). Other biomechanical factors include, fracture and tear injuries, muscle weakness, and occupational activities.

Treatment

Although treatment approaches to osteoarthritis vary from traditional to non-traditional, the ultimate goal is to decrease pain, and increase function and mobility in patients. Traditionally, physicians have recommended nonsteroidal anti-inflammatory

drugs (NSAIDs) to help ease joint pain. Many of these medications are available over the counter and are usually less expensive than those prescribed. However, research shows that these medications as well as others have side effects. One of the most serious side effects experienced is gastrointestinal bleeding, especially in those over 65 years of age (Arthritis Foundation, 2000). Depending on the severity of the osteoarthritis, steroidal injections are also used by physicians. For more severe cases of the disease surgery is commonly recommended. Total joint replacement constitutes the most significant advancement in osteoarthritis treatment. It is considered the most effective of all therapeutic procedures available to patients (Hochberg, McAlindon, & Felson, 2000).

Other therapeutic methods include exercise, weight control, and alternative medicine. Research has shown that exercise is one of the best treatments for osteoarthritis. Exercise helps strengthen and condition muscle to provide support for the symptomatic joint (Hochberg et al., 2000). It also increases flexibility and range of motion. Maintenance of an acceptable body weight is also a form of treatment. Since obesity is associated with the development and progression of osteoarthritis, weight loss can reduce extra stress on weight bearing joints (Felson & Zhang, 1998). Some patients prefer to use nontraditional or alternative approaches such as acupuncture, physical therapy, and herbal remedies in conjunction with conventional medicines because they believe they are more effective (Hochberg et al., 2000).

Impact on public health

It is estimated that 1 in 6 of the US population is affected by arthritis. Even more profound is that of the 266 million who are affected by arthritis (Brandt, 1998), 21

million people have the most common form, osteoarthritis (Elders, 2000). Since age has been identified as the most associated risk factor in developing the disease it is expected that these numbers will only increase. Over the past 20 years the 65 and older population has increased by half (Elders, 2000). Therefore, it is projected that arthritis will affect approximately 60 million individuals by the year 2020 (Center for Disease Control, 2000).

The debilitating effects osteoarthritis on the elderly has a substantial burden on their lives and the lives of others. Some of the challenges faced by patients include, cost of treatment, job limitations, depression, and decrease in mobility. A survey conducted by the Behavioral Risk Factor Surveillance System (BRFSS) found that those living with arthritis have a worse health-related quality of life (HRQOL) than people without arthritis due to the poor physical health and mental health (Center for Disease Control, 2000). These issues of affordable medical care and improving the health quality of life for osteoarthritis patients greatly impact public health. Since there is no known cure for osteoarthritis, the most effective way to manage the disease is through treatment. In 1996 more than one-third of US healthcare expenditures went to caring for the 65-year and older population. This was primarily due to medication cost and assisted living requirements associated with debilitating chronic diseases such as arthritis (Elders, 2000).

Currently, research is being conducted to uncover more effective and more affordable means of dealing with the challenges of osteoarthritis and other chronic diseases. These measures are oriented toward preventing the progression of disease (Elders, 2000). By delaying the onset of osteoarthritis, the total lifetime disability of the disease can be substantially reduced. This is the goal of The National Arthritis Action

Plan: A Public Health Strategy (Jordan et al., 2000). Other suggestions for early prevention as well as effective disease management include patient education, and counseling. Education of patients on the effect of exercise, diet, and injury prevention on osteoarthritis has proven beneficial (Creamer & Hochberg, 1997).

Healthcare utilization

Several studies have assessed the utilization and costs associated with healthcare services. Information gathered from such research not only identifies which services are being used but also who uses them. Few studies have examined the relationship between specific conditions, the ambulatory care services provided, and those who receive them. However, those that have investigated such ambulatory patterns have provided insight into the disparities that exist among race, ethnicity and socioeconomic status. For example, the National Center for Health Statistics (NCHS) described ambulatory visits for asthma in the US over a 2-year period between 1993-1994. The results indicate that the use of hospital emergency room services was greater for blacks compared to whites but no different for visits to physician offices (Burt & Knapp, 1996).

Another study reported on the difficulty Hispanics have accessing healthcare services. It reported that Hispanics made more visits to the clinics, and hospital emergency rooms and less to physician offices (Andrews & Elixhauser, 2000). The study also found that they were less likely than non-Hispanics to receive major therapeutic services including those related to osteoarthritis. A third study describing ambulatory care visits for gynecologic disorders determined that patient factors of race, expected

source of income, and median income are predictive of emergency department visits (Nicholson & Ellison, 2000).

Some studies have investigated the utilization of ambulatory care services by the elderly for conditions such as rheumatism. They, too, have identified some variations related to the utilization of health services. One study found that among Medicare patients in Colorado, Massachusetts, and Virginia, blacks were referred to rheumatologists less often than whites. The same study also determined that the elderly were less likely to see a rheumatology specialist although their services were recommended. This pattern of low usage of healthcare services by the elderly could impact treatment and disease management outcomes for arthritis (Katz, Barrett, Liang, Kaplan, Roberts, & Baron, 1998).

CHAPTER 3

METHODS

Data Sources

Data were obtained from the National Ambulatory Medical Care Survey (NAMCS) and the National Hospital Ambulatory Medical Care Survey (NHAMCS) through the National Center for Health Statistics (NCHS) of 1998. Both the NAMCS and the NHAMCS report information on the use of ambulatory care services in the United States. Although the ambulatory care surveys are based on a sample of visits not of the population, data provided can be used to obtain a rate of visits for a diagnosis of interest.

Findings of the NAMCS are based on a sample of visits to non-federal office-based physicians who are engaged in direct patient care. The physician or office staff collected data over a 1-week period during which a systematic random sample of visits are recorded. Information collected included patients' symptoms, physicians' diagnosis, medications ordered, demographic characteristics of patients and services provided. The NHAMCS is based on a national sample of visits to the emergency departments and outpatient departments of non-institutional, general and short-stay hospitals, exclusive of Federal, military, and Veterans Administration hospitals. Hospital staff collected information for a systematic random sample of patient visits during a 4-week period. Data reported include patient demographic characteristics, expected source of payment, diagnostic/screening services, procedures and medication therapy.

The confidentiality of the NAMCS and NHAMCS data is protected under Title 42, US Code, Section 242m for the purpose of health research and statistical purposes only. There is no identifiable information of the patients or providers that can be released without their consent. Public health policy makers, health service researchers, medical schools, physician associations, and epidemiologist use information provided by these surveys. Data are disseminated in the form of public health reports, journal articles, and microdata files (National Center for Health Statistics, 2000).

Selection of cases

Osteoarthritis visits were isolated using the *International Classification of Diseases* (ICD). The ICD-9 diagnosis codes for osteoarthritis under the category 715 were selected from the original data set. This category included 715.0, 715.1, 715.2, 715.3, 715.8 and 715.9 codes along with the fifth-digit classification. They were defined respectively as generalized, localized primary, localized secondary, no primary or secondary specified, more than one site, and unspecified generalized or localized osteoarthritis (Medicode, 2001). Diagnosis codes for patients with rheumatoid arthritis were excluded from the selection of cases for this study.

On both the NAMCS and NHAMCS Patient Record form, up to three physician diagnosis could be recorded and classified according to the ICD-9 codes. For purposes of this study, only the first-listed diagnosis was used to identify osteoarthritis visits.

Statistical analysis

The Statistical Package for the Social Sciences (SPSS) software was used to conduct data analysis. Independent variables of interest include patient characteristics (age, gender, race, and ethnicity) and expected source of payment. Other variables related to diagnostic/screening services, therapeutic and preventive services, and counseling/education were also described. A descriptive analysis of the data was obtained by running frequency distributions of the variables. This was done to identify patient characteristics and the most common types of procedures provided. Crosstabulation and chi-square were also performed to test the independence of age, gender, race, ethnicity and expected source of payment as they relate to the type of treatment services received at each ambulatory facility.

CHAPTER 4

RESULTS

Patient characteristics

In 1998, there were an estimated 829.3 million visits made to ambulatory care facilities in the United States. The sample of patient records obtained through the National Ambulatory Medical Care Survey (NAMCS) and the National Hospital Ambulatory Medical Care Survey (NHAMCS) totaled 76,916. Of these visits, 23,339 were made to the physician in-office; 29,402 to the hospital outpatient department; and 24,175 to emergency departments across the country. Osteoarthritis visits totaled 367 of the patient records reported: 184 (50%) to office-based physicians, 162 (44%) to hospital outpatient departments, and 21 (6%) to hospital emergency departments.

Patient race was classified as white, black, other (which includes Asian/Pacific Islander and American Indian/Eskimo/Aleut). Ethnicity was based on Hispanic or non-Hispanic origin. Tables 1—4 illustrate patient characteristics of those who visited ambulatory care facilities. Office-based visits for osteoarthritis consisted of 82% white, 14% black and 4% other (2% Asian/Pacific Islander, 2% American Indian/Eskimo/Aleut) (Table 1). This sample of the Hispanic population was representative of only 3% of the physician office osteoarthritis visits compared to 79.9% non-Hispanic. Of the total cases reported in the survey, 126 (69%) were female while 58 (32%) were male (Table 2). Patient age was grouped as follows: 25-44 years, 45-64

years, 65-74 years, and 75 years and over. Patients less than 65 years of age comprised 41% of the physician office visits, while those 65-74 years and 75 years and over made up 31% and 27% respectively.

Table 1. Physician Office-based Visits by Race

	Frequency	Percent
White	151	82.1
Black	26	14.1
Other	7	3.8
Total	184	100.0

Table 2. Physician Office-based Visits by Gender

	Frequency	Percent
Female	126	68.5
Male	58	31.5
Total	184	100.0

Hospital outpatient utilization was also higher for females (68%) than males (32%) and for whites (61%) than blacks (35%) (Table 3,4). Again, Hispanics and Asian/Pacific Islander made up a smaller percentage, 16 percent and 4 percent, respectively. Approximately 50 % of the patients less than 65 years used hospital outpatient services followed by 28% of the 65-75 year old patients. Only 22% of patients 75 years and older frequented outpatient facilities.

Table 3. Hospital Outpatient Visits by Gender

	Frequency	Percent
Female	110	67.9
Male	52	32.1
Total	162	100.0

Table 4. Hospital Outpatient Visits by Race

	Frequency	Percent
White	98	60.5
Black	57	35.2
Other	7	4.3
Total	162	100.0

The primary expected source of payment for patients who made visits to physicians' offices was Medicare (54%) followed by private insurance (37%). Worker's compensation and self-pay were combined in the classification of other and together constituted about 8% of the payment source. For hospital outpatient visits, the primary payment sources were Medicare (44%), Medicaid (29%), and private insurance (12%).

Records obtained from hospital emergency departments for the utilization of services for osteoarthritis patients were small, n=21.

Therapeutic and preventive services

Data were provided for surgical procedures, medications ordered, and any preventive measures discussed. Among the different ambulatory care settings, medications were the most frequent form of treatment for patients with osteoarthritis. Medications were ordered 77% of the time in physician office settings and 87% of the time in hospital outpatient facilities. Ambulatory surgical procedures occurred much less frequently at both physician offices and outpatient facilities. There were only 4 (2%) surgical procedures reported for osteoarthritis patients who made visits to physician offices and 5 (3%) at hospital outpatients departments.

Therapeutic and preventive services coded included counseling on the following: diet and nutrition, exercise, and injury prevention. For office visits and hospital outpatient visits, education on prevention was observed 38% and 42% of the time, respectively. However, counseling on diet and nutrition was higher for patients using hospital outpatient services (17%) than physician offices (9%). In the area of exercise, both in office and outpatient, counseling was provided almost 25% of the time. Finally, education on prevention of further injury was observed in only 4% of visits made to physician office and 3% of hospital outpatient visits.

Measures of association

Crosstabulations and chi-square (Pearson χ^2) statistical tools were used to determine whether an association exists among patient characteristics variables (age, gender, race, and ethnicity) and expected source of payment and treatment services

provided at each ambulatory care location. It was hypothesized that the variables were independent of each other. Patient age, gender, ethnicity, and expected source of payment showed no significant relationship with respect to therapeutic services provided. Therefore the null hypothesis (H_0): patient demographic characteristics and source of payment are independent of the type of treatment received at the ambulatory care facilities was accepted.

However, patient race and expected source of payment were compared and an association was found. Of osteoarthritis patients who made visits to physicians' offices, only 7% of blacks used Medicare as their primary source of payment compared to 93% of whites using the same form of payment ($X^2=15.5, p<.001$). A similar relationship was observed among hospital outpatient visits. Whites made up 70% of Medicare users compared to 30% of blacks ($X^2=13.8, p=.003$). Therefore there is a significant association between patient race and expected source of payment.

CHAPTER 5

DISCUSSION

Conclusion

Studies have found variations in the use of ambulatory care facilities in the US among whites, blacks, and Hispanics (Andrews & Elixhauser, 2000; Burt & Knapp, 1996). This study of the sample of visits made to these facilities by patients with osteoarthritis was consistent with existing reports in relation to patient characteristics. Overall ambulatory care services were most frequented by whites than blacks. With fewer blacks using ambulatory care facilities, they are less likely to receive information from medical professionals about their disease. This means missed opportunities for educating these patients on management, treatment, and injury prevention for osteoarthritis (Hootman, Helmick, & Schappert, 2000). Compared to whites, blacks and Hispanics used hospital outpatient services more often than physician office-based services. These results imply that a lack of stability of care may exist for outpatient department users compared to patients who visit physician offices (Burt & Knapp, 1996). This may be the result of a lower rate of follow-up visits by these patients.

Results of the study also indicated a difference in patient age for those visiting the ambulatory care facilities. The trend observed was that more osteoarthritis patients under the age of 65 years frequented healthcare facilities more often than those 75 years and older. This may suggest that those under 65 years are seeking osteoarthritis treatment,

prevention and management earlier through increased knowledge of the disease and its effects. Although this lower utilization pattern by patients over the age 75 years could also be contributed to a lack of affordable healthcare and limited coverage by their health provider.

After analyzing patient characteristics with the types of services provided, there was no significant difference in the type therapeutic services provided to patients. Therefore, it can be concluded from this study that patients who are using ambulatory care facilities for osteoarthritis treatment are receiving a standard form of treatment. It was observed, however, that a difference exists between patient race and source of payment although no association was made between payment source and the type of care received. The trend showed fewer blacks used Medicare and private pay for expected source of payment during visits than whites. Through further research these results may explain why there are fewer blacks using ambulatory care facilities.

Although exercise, diet and injury prevention have been found to be effective methods of treatment, the results of this study indicated that few patients are receiving education or counseling in any of these areas. Counseling on diet and nutrition was slightly higher for patients using hospital outpatient departments. Surgery has been labeled the most beneficial form of treatment for severe cases of the disease (Hochberg, et al., 200), however, there were few recorded surgeries performed at the health care facilities. Medications were the most prescribed method of treatment for these patients.

Limitations

This study was conducted using the National Center for Health Statistics NAMCS and NHAMCS. Since these surveys are based on a sample, of ambulatory care visits, sampling variability may exist (Burt & Knapp, 1997). In addition, the small numbers obtained from the sample of patient records for emergency room departments made it difficult to make comparisons among the three ambulatory settings. However, the information available through the survey does allow important inferences to be made about the use of ambulatory care facilities.

Future Recommendations

Since osteoarthritis has been identified as one of the most substantial debilitating chronic diseases affecting the elderly population (Jordan, et al., 2000), more research into how to improve patient outcome through education on disease prevention, and disease manageability is needed. These types of interventions help patients increase function and decrease pain associated with their disease. By decreasing pain, and increasing function, it is expected that there will be fewer hospitalizations and a decrease in the need for medication. Both outcomes would decrease costs to the patients and overall healthcare expenditures.

It is estimated that in the United States more than 20 million people are affected by osteoarthritis (Elders, 2000) and the burden of the disease is expected to increase. It was determined through this study that no exist among the type of treatment received by patients, although utilization of services differ among gender and race. Therefore the goal is to make ambulatory care access available to all patients needing care.

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