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# Health-Related Quality of Life Predicts Future Health Care Utilization and Mortality in Veterans with Self-Reported Physician-Diagnosed Arthritis: The Veterans Arthritis Quality of Life Study

Jasvinder A. Singh, MD, MPH,\* David B. Nelson, PhD,<sup>†</sup> Howard A. Fink, MD, MPH,<sup>‡</sup> Kristin L. Nichol, MD, MPH, MBA<sup>§</sup>

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**OBJECTIVE** To investigate whether health-related quality of life (HRQOL) measures predict health care utilization and mortality in a cohort of veterans with self-reported physician-diagnosed arthritis.

**METHODS** A cohort of veterans from the Upper Midwest Veterans Integrated Service Network (VISN) was mailed a self-administered questionnaire that was composed of the SF-36V (modified from SF-36 for use in veterans) and questions regarding demographics, current smoking status, limitation of activities of daily living (ADLs), and preexisting physician-diagnosed medical conditions, including arthritis. Within subjects reporting physician-diagnosed arthritis, we analyzed the associations between the SF-36V component summary scales (physical and mental component summary, PCS and MCS, respectively) and the occurrence of any hospitalization, number of hospitalizations, number of outpatient visits, and mortality, for the year after survey administration, using multivariable regression analyses.

**RESULTS** Of 34,440 survey responders who answered a question regarding arthritis, 18,464 (58%) subjects reported physician-diagnosed arthritis. Arthritic patients in the lowest tertile of PCS scores had significantly higher odds of any hospitalization (Odds ratio (OR) 1.49, 95% confidence interval (CI) [1.25-1.76]) and mortality (OR 1.69, 95% CI [1.18-2.42]), and a significantly higher number of hospitalizations/year (Rate ratio (RR) 1.09, 95% CI [1.05-1.13]) and outpatient visits/year (RR 1.07, 95% CI [1.03-1.11]). Arthritic patients in the lowest tertile of MCS scores had significantly higher odds of any hospitalization (OR 1.20, 95% CI [1.02-1.41]), mortality (OR 2.14, 95% CI [1.56-2.94]), and a significantly higher number of hospitalizations/year (RR 1.05, 95% CI [1.02-1.09]) and outpatient visits/year (RR 1.07, 95% CI [1.03-1.11]).

**CONCLUSIONS** HRQOL, as assessed by the SF-36V, predicts future inpatient and outpatient health care utilization and mortality in veterans with self-report of physician-diagnosed arthritis.

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**KEYWORDS** arthritis, HRQOL, SF-36, health care utilization, mortality

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\*Rheumatology Section, Medicine Service, VA Medical Center, Minneapolis, MN and Division of Rheumatology, Department of Medicine, University of Minnesota, Minneapolis, MN.

<sup>†</sup>Center for Chronic Disease Outcomes Research, VA Medical Center, Minneapolis, MN.

<sup>‡</sup>Medicine Service, Geriatric Research Education & Clinical Center and Chronic Disease Outcomes Research, VA Medical Center, Minn., MN; Department of Medicine, Univ. of Minnesota, Minneapolis, MN.

<sup>§</sup>Medicine Service, Center for Chronic Disease Outcomes Research, VA Medical Center, Minn., MN.

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Address reprint requests to Jasvinder A Singh, MD, MPH, Minneapolis VA Medical Center (111R), One Veteran's Drive, Minneapolis, MN 55417. E-mail: Jasvinder.Singh@med.va.gov

Arthritis and other rheumatic conditions are among the commonest illnesses in the United States (U.S.). These diseases affected an estimated 70 million people in 2001 (1), cause significant physical and psychological morbidity (2,3), and are the leading cause of disability in the U.S. (4). They also constitute a significant health and financial burden on the U.S. health care system. These conditions led to 744,000 hospitalizations and 44 million ambulatory-care visits in 1997 (5) and cost \$149 billion in direct and indirect costs (2.5% of the Gross National Product) in 1992 in the U.S. (6).

Due to a continuing increase in health care costs, an increasing number of studies have assessed various risk factors for high health care utilization, including health-related quality of life (HRQOL). HRQOL measures are associated with hospitalization in patients with chronic diseases like asthma, chronic obstructive lung disease, congestive heart failure, and inflammatory bowel disease (7-11). Very few studies have evaluated the relationship of HRQOL and health care utilization in arthritis patients, and all studies found a positive association between poor HRQOL and higher health care utilization (12-16). However, these studies were small with sample sizes of less than 1000 patients (12-16), and all but 1 study (12) selected patients from rheumatology clinics rather than including patients from all clinics. Only 2 studies (12,14) included patients with osteoarthritis, and only 1 study (12) adjusted for prior health care utilization, which is a strong determinant of future health care utilization (12).

The Veterans Health Administration (VHA) is the largest integrated health system in the United States. The VHA provides health care to U.S. war veterans, who are predominantly elderly, poor, and medically underserved men (17-19). The VHA provided health care to more than 3 million veterans with a medical care budget of \$17.9 billion in the fiscal year 1998 (20,21). Arthritis was 1 of the top 5 most common chronic conditions in a sample of the 3.4 million

veterans who received health care in the veteran affairs (VA) system in fiscal year 1999 (22). None of the previous studies in arthritic subjects included veterans, who are known to be sicker (23) and have poorer HRQOL (24) than non-VA patients. We sought to identify whether the physical component summary and mental component summary (PCS and MCS, respectively) of the SF-36, and other demographic and clinical factors, prospectively predicted the risk of increased health care utilization and mortality in a large cohort study of veterans with self-reported physician-diagnosed arthritis who receive health care at VA hospitals and clinics.

## Methods

### Participants

Subjects were considered eligible for the present analyses if they were veterans who had completed a mailed survey questionnaire in which they self-reported a physician-diagnosis of arthritis. The self-administered questionnaire was mailed to all veterans in the Upper Midwest Veterans Integrated Service Network (VISN 13) who had at least 1 outpatient encounter or inpatient stay between 10/1/97 and 3/31/98 at a VISN 13 facility and a valid mailing address—VISN 13 Veterans Quality of Life Study (VISN 13 Vet-QOL Study) (25). VISN 13 consisted of a regional network that provided health care to veterans from all of Minnesota, North Dakota, and South Dakota, and selected counties in Iowa, Nebraska, Wisconsin, and Wyoming. An initial mailing was sent in August, 1998, with a second mailing to nonresponders 10 weeks later. The Veterans Arthritis Quality of Life Study (VAQS) was comprised of subjects who reported the presence of physician-diagnosed arthritis. VISN 13 no longer exists, having merged with another network directly to its south subsequent to the completion of our study, and is now a part of VISN 23 (which includes Iowa, Minnesota, Nebraska, North Dakota, South Dakota, and portions of northern Kansas, Missouri, western Illinois, Wisconsin, and eastern Wyoming).

### Survey Questionnaire

The self-administered survey questionnaire consisted of 3 components. The first component comprised questions assessing gender, education level, race/ethnicity, current use of cigarettes, and whether the patient had ever been told by a physician that he/she had any of the following conditions: arthritis, chronic obstructive lung disease (COPD)/asthma, heart disease, hypertension, diabetes, and depression. The second component comprised the SF36-V, a version of the short form-36 (SF-36) health-related quality of life (QOL) questionnaire adapted for use in the VA outpatient population (24,26,27). The SF-36 is a generic measure of HRQOL that has been found to be valid, reliable and responsive to clinical change in patients with arthritis (28-33). The Short-Form 36 modified for veterans (SF-36V) consists of 8 multi-item subscales namely, physical functioning, role physical (role limitations due to physical problems), bodily pain, general health, energy/vitality, social functioning, role emotional (role limitations due to emotional problems), and mental

#### Abbreviations

<b>ADL</b>	<b>Activity of Daily Living</b>
<b>BIRLS</b>	<b>Beneficiaries Identification Record Locator System</b>
<b>CI</b>	<b>Confidence Interval</b>
<b>HMO</b>	<b>Health maintenance organization</b>
<b>HRQOL</b>	<b>health-related quality of life</b>
<b>MCS</b>	<b>mental component summary</b>
<b>OPC</b>	<b>Outpatient Clinic Tables</b>
<b>OR</b>	<b>Odds Ratio</b>
<b>PCS</b>	<b>physical component summary</b>
<b>PTF</b>	<b>Patient Treatment File</b>
<b>QOL</b>	<b>quality of life</b>
<b>SD</b>	<b>Standard Deviation</b>
<b>SF-36V</b>	<b>Short-Form 36 modified for veterans</b>
<b>VA</b>	<b>Veterans Affairs</b>
<b>VHA</b>	<b>Veterans Health Administration</b>
<b>VISN</b>	<b>Veterans Integrated Service Network</b>

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