Spondyloarthritis Is Associated with Poor Function and Physical Health-Related Quality of Life

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ABSTRACT. ***Objective.*** To study physical function and health-related quality of life (HRQOL) in US veterans with spondyloarthritis (SpA).

Methods. In a postal survey of 70,334 eligible veterans, demographics, performance of activities of daily living (ADL), and HRQOL, by Veterans Short Form-36, were queried; 58% responded (n = 40,508). Databases provided *International Classification of Diseases*, 9th ed. codes for ankylosing spondylitis (AS), psoriatic (PsA) and reactive arthritis (ReA), comorbidities, and demographics. Multivariable linear/logistic regressions compared ADL limitations and HRQOL in SpA versus non-SpA, and predictors in SpA.

Results. Six hundred sixty-four veteran respondents had diagnoses of SpA: AS, n = 100; PsA, n = 551; ReA, n = 13. Veterans with AS, PsA, and ReA had significantly more limitations in dressing (44%, 23%, 24% vs 22%; p = 0.0002), transferring (57%, 42%, 64% vs 39%; p = 0.0006), walking (74%, 57%, 67% vs 54%; p = 0.0005), and overall mean ADL limitations (2.5, 1.7, 2.1 vs 1.6; p < 0.0001) compared to veterans without SpA, after multivariable adjustment. Limitations in each ADL in patients with SpA were 1.3–5.3 times that of an age-matched US cohort. Physical HRQOL was significantly lower compared with non-SpA veterans (p < 0.0001 for physical component summary, physical functioning, role physical, and bodily pain; p = 0.004 for general health) and age-sex-matched US norms; all differences exceeded clinically meaningful threshold of 5–10 units. More limitations in ADL were significantly associated with lower physical component summary scores in patients with AS and with lower physical and mental component summary scores in PsA.

Conclusion. After adjustment for differences in demographics and comorbidities, poorer physical function and HRQOL were observed in patients with SpA. Strategies focused to improve/maintain functional status are important for treatment of SpA. (First Release April 15 2009; J Rheumatol 2009;36:1012–20; doi:10.3899/ jrheum.081015)

Key Indexing Terms:
PSORIATIC ARTHRITIS ANKYLOSING SPONDYLITIS REACTIVE ARTHRITIS
FUNCTIONAL LIMITATION HEALTH-RELATED QUALITY OF LIFE

Spondyloarthritis (SpA) includes a group of common diseases such as ankylosing spondylitis (AS), psoriatic arthritis (PsA), and reactive arthritis (ReA). SpA is prevalent, affecting 1%–3% in the general population[1-3]. Many elegant studies have reported that functional status[2-13] and health-related quality of life (HRQOL)[8,14-20] are impaired in these patients. Functional status is a strong driver of total and direct costs[21-23]. Functional limitations, as assessed by performance of activities of daily living (ADL)[3,5,7,10] or using validated instruments[2,4,6,8,9,11-13], are commonly reported by patients with SpA. Most previous studies had no comparison group[2-6,10,11,13], except a few that compared subgroups of patients with each other (AS vs PsA) or to patients with rheumatoid arthritis (RA)[7-9,12]. Similar rates of functional limitations in SpA versus RA and AS versus PsA[8,9,12] were reported. The published literature has several limitations: (1) most included patients referred to specialty clinics and none were population-based and therefore may have limited generalizability; (2) analyses were not adjusted for confounders such as age, sex, or comorbidities, all of which affect physical function[24-26]; and (3) with the exception of 3 series[4,9,12], most had small sample sizes < 200. Thus, we need population-based studies of functional status in patients with SpA to improve our understanding of the independent effect of SpA on patients' functional status. Such studies should control for important confounders such as comorbidity and sociodemographics.

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Ware has proposed that the best means to understand burden of disease in a specific population is to compare it with the general population[27]. Generic measures, such as the Medical Outcomes Study Short Form-36 (SF-36), allow comparisons across disease-specific populations and provide information on disease consequences that disease-specific HRQOL measures may fail to detect[28]. Three studies that compared HRQOL of patients with AS[15,16] and PsA[14] to the general population reported significantly lower HRQOL on physical and to a lesser extent on psychosocial domains — raw scores[15] or age-sex-adjusted scores[14,16] were lower. There is a renewed interest in HRQOL and functional status of patients with SpA due to availability of new effective biologic therapies. However, with the exception of a Norwegian population-based study[15], these data have been reported in clinical trial[16] or tertiary referral center populations[14] that are not representative of community-based SpA patient populations.

The objective of our study was to determine impairments in physical function and HRQOL in a population-based cohort of patients with SpA receiving care at Veterans Affairs (VA) medical facilities. The VA represents the largest integrated healthcare system in the US, providing healthcare to more than 4.9 million subjects, and with a budget of $25 billion in 2003[29]. It is well-suited for a population based study of SpA, as it has one of the most advanced computerized medical record systems, arthritis is the fifth most common medical condition in veterans[30], and the VA provides care to a male-predominant population. Thus, in this population-based cohort, we aimed to (1) compare reported performance of ADL and HRQOL in veterans with AS, PsA, and ReA to those without SpA and to matched US cohorts; and (2) study if HRQOL in patients with SpA are attributable to sociodemographics, functional limitations, and/or comorbidities.

MATERIALS AND METHODS

Patient population. Details of the original study, the Veterans Quality of Life (Vet-QoL) study, have been published[31]. The study was approved by the Minneapolis VA Institutional Review Board. VISN-13 is a network of in- and outpatient medical facilities providing medical care to veterans in the geographical area consisting of North Dakota, South Dakota, Minnesota, and selected counties of Iowa, Nebraska, Wisconsin, and Kansas. Veterans with out- or inpatient encounters at a VA facility in this network during an 18-month period (October 31, 1996 to March 31, 1998) and a valid mailing address received a survey. Nonresponders received a reminder survey; survey response rate was 58% (40,508/70,334). Survey data were supplemented by administrative information, including *International Classification of Diseases*, 9th ed. (ICD-9) diagnoses codes for AS (720.0), PsA (696.0), and ReA (099.3, 711.11-711.19), race, employment status, age, and sex. ICD-9 codes were extracted for all VA encounters for the year prior to the survey from patient treatment and outpatient datasets. Diagnoses of AS, PsA, and ReA in the Minneapolis VA databases were found to have high specificity and predictive values of 89%–100% and good sensitivity of 71%–100%[32].

Survey data. The survey included questions regarding age, race, sex, marital status, education level, functional and health status. Physical function was assessed querying limitations (no, some, unable) in 6 ADL (bathing, dressing, eating, transferring to and from chair, walking, and using the toilet) — the Katz ADL index, a validated measure of ADL ability[33], used very commonly in cohort studies[34,35]. HRQOL was measured using Short Form-36 for Veterans (SF-36V), a valid and reliable questionnaire assessing 8 domains including physical functioning (PF), role physical (RP), bodily pain (BP), general health (GH), vitality (VT), social functioning (SF), role emotional (RE), and mental health (MH)[36]. Physical component (PCS) and mental component summary (MCS) scores are calculated from the 8 domains, norm-based and standardized with a mean of 50 and a standard deviation (SD) of 10. SF-36 has been widely used in health surveys in the general population as well as in rheumatologic diseases[37,38], and shown to be valid and reliable in patients with PsA[14,18] and AS[15,16,39-41].

Outcomes of interest. Impairment in physical function was assessed by patient-reported limitations in ADL; HRQOL by SF-36V domain and summary scores. Each ADL limitation was categorized as any versus no limitation (dichotomous), and total ADL limitations ranging 0–6, categorized into "no": 0 ADL, "moderate": 1–2 ADL, or "severe limitations": ≥ 3 ADL, similar to previous studies[34,42]. "Clinically meaningful" differences were based on definitions for minimal clinically important differences (MCID) of 5–10 points in domain and 2.5–5 points in summary component scores of SF-36 derived from published randomized controlled trials in AS, RA, osteoarthritis, PsA, and systemic lupus erythematosus[16,43-46]. SF-36 PCS and MCS scores were divided into quartiles for regression analyses.

Predictors of interest and confounders/covariates. The predefined hypothesis of the study was that patients with AS, PsA, or ReA would have poorer functional status and HRQOL than the general population without SpA, in unadjusted and multivariable-adjusted analyses. Based on reports in other medical conditions[47-49], multivariate analyses for functional limitations and HRQOL were adjusted for potential confounders, including (1) demographics: age (yrs), sex (male/female), race (white vs other), education level (< grade 8, grade 8–11, high school graduate, or college and beyond), employment status (employed, unemployed, retired, unknown), marital status (married, not married); (2) comorbidity: sum of comorbidities including asthma/chronic obstructive pulmonary disease (COPD), depression, diabetes, hypertension, or heart disease (comorbidity scale ranging from 0–5); and (3) current smoking status (smoker vs nonsmoker). To study predictors of physical and mental/emotional HRQOL (using PCS and MCS scores), ADL limitations and comorbidities were considered the main predictors of interest.

Analyses. Chi-square tests and independent sample t-tests were used for categorical and continuous variables, respectively, comparing SpA to non-SpA patients. ADL limitations were compared to an age-matched US cohort from the San Luis Valley Health and Aging Study that used stratified sampling on age and ethnicity of residents age ≥ 60 years from 2 rural Southern Colorado counties[35]. SF-36V domain scores of patients with AS or PsA (too few patients with ReA) were compared to age- and sex-matched US population norms — since 98%–99% of AS/PsA patients were men, age-matched US means for men were utilized[50].

We compared unadjusted and multivariable-adjusted least-means square scores for the SF-36V subscales, PCS and MCS scores between patients with AS, PsA, and ReA compared to those without SpA using linear regression. The proportion with each ADL limitation and overall proportion with no, moderate, or severe ADL limitations were similarly compared using logistic regression analyses. Multivariable regression models were adjusted for sociodemographic, comorbidity, and smoking status, as described above. Since conclusions based on adjusted estimates were not different from those based on unadjusted estimates, i.e., estimates were robust regardless of adjustments for sociodemographics, comorbidity, and smoking status, both estimates are presented in the main tables, but only multivariable adjusted estimates are discussed.

In patients with AS and PsA, logistic regression analyses assessed predictors for reporting the worst quartile of SF-36V PCS or MCS scores. In addition to sociodemographics, comorbidity, and current smoking status

described above, multivariable analyses modeled ADL limitations described above as covariates for these regression analyses. Regression analyses were not performed individually in patients with ReA due to small numbers. All analyses were performed using SPSS version 11.0.1 (SPSS Inc., Chicago, IL, USA). A p value < 0.05 was considered significant.

RESULTS

Demographic and clinical characteristics of patients with AS, PsA, and ReA. Of the 70,991 veterans, 70,334 were eligible, i.e., were alive and had a valid mailing address. Overall, 1,001/70,991 patients had diagnoses of SpA: AS (n = 154), PsA (n = 814), and ReA (n = 33). Of the 40,508 survey respondents (58%), 100 had AS, 551 had PsA, and 13 had ReA. Table 1 presents sociodemographic characteristics in veterans with and without SpA. Patients with SpA were predominantly men, with a mean age ranging from 46 to 65 years. Compared to the general veteran population, patients with PsA had more comorbidities, and those with ReA were younger, more likely to be female, employed, or current smokers, with fewer comorbidities.

Survey nonresponders were significantly less likely to be married (47% vs 64.9%) or retired (26.7% vs 43.9%) and were younger (56.3 vs 64.5 yrs), as compared with responders.

More functional limitations in SpA than non-SpA patients. After multivariable adjustment, patients with AS, PsA, and ReA reported greater mean ADL limitations than patients without SpA (2.5, 1.7, and 2.1 vs 1.6; p < 0.0001; Table 2); significantly more limitations in dressing (43.8%, 22.6%, and 23.7% vs 22.1%; p = 0.0002), transferring (57.4%, 42.3%, and 64.1% vs 38.8%; p = 0.0006), and walking (74%, 56.6%, and 67.2% vs 53.7%; p = 0.0005), respectively. Smaller but significant differences were evident for difficulty in bathing (41.2%, 26.8%, and 29.5% vs 25.7%; p = 0.026) and eating (25.6%, 11.8%, and 21.7% vs 14%; p = 0.026). No differences were noted in limitations using toilet.

Comparison to an age-matched US cohort aged 60 years or older from San Luis Valley, the frequency of limitation of bathing, dressing, transferring, eating, and toileting was 1.3–3 times in our patients with SpA ≥ 60 years (Figure 1). The limitation in walking was 3.7–5.3 times as frequent. Overall ADL limitation of any ADL 1–2 or ≥ 3 ADL was 1.3–2.3 times as compared to this age-matched US cohort (Figure 1).

Poorer HRQOL in patients with SpA. As presented in Table 2, patients with AS, PsA, and ReA reported significantly lower/poorer multivariable adjusted scores in physical functioning, role physical, bodily pain, general health domains, and PCS, compared to veterans without SpA. Reported differences were most marked between patients with AS and non-SpA and approached clinically meaningful levels in physical HRQOL domains, and were less in those with ReA or PsA. No differences were noted in social functioning, role emotional, vitality, mental health, and MCS domains.

Compared to age- and sex-matched US norms, AS and PsA patients reported significant deficits in physical domains (34%–50% reductions) and less but still significant deficits in general health/vitality (27%–36% lower) and mental/emotional domains (11%–29% reductions) (Figure 2).

Predictors of HRQOL in patients with AS and PsA. Tables 3 and 4 show predictors significantly associated with poorer

Table 1. Demographic and clinical characteristics of patients with ankylosing spondylitis, psoriatic arthritis, and reactive arthritis and subjects without spondyloarthritis.

	No Spondyloarthritis (n = 39,839) mean ± SD or %	Ankylosing Spondylitis (n = 100) mean ± SD or %	Psoriatic Arthritis (n = 551) mean ± SD or %	Reactive Arthritis (n = 13) mean ± SD or %	p
Demographics					
Age, yrs	64 ± 14	61 ± 13	65 ± 12	46 ± 7	< 0.001
% male	96	98	99	85	0.002
% white	90	95	92	92	0.094
% married	65	66	64	58	0.93
Education					0.143
≤ grade 8	19	13	16	8	
Some high school	11	8	13	8	
High school graduate	35	32	37	39	
College and beyond	36	47	34	46	
Employment status					0.05
Employed	32	38	28	62	
Unemployed	18	15	18	23	
Retired	44	42	49	15	
Unknown	7	5	5	0	
Clinical characteristics					
% with ≥ 1 comorbidity*	57	64	68	31	< 0.001
% current smokers	23	20	24	58	0.029

* p value is for comparison between subjects without spondylarthritis to those with ankylosing spondylitis, psoriatic arthritis, or reactive arthritis.

Table 2. Unadjusted and multivariable adjusted† least-means squared scores (with 95% confidence intervals) for health related quality of life (HRQOL) and functional limitation in patients with and without spondyloarthritis (SpA).

	Unadjusted Scores					Adjusted Scores				
	No SpA	AS	PsA	ReA	p	No SpA	AS	PsA	ReA	p
SF-36V summary										
PCS	**35.3 (35.1, 35.4)**	**28.9 (26.3, 31.4)**	**34.1 (33, 35.3)**	**36.8 (29.9, 43.6)**	**< 0.0001**	**35 (34.9, 35.2)**	**27.7 (25.3, 30.1)**	**34.4 (33.3, 35.4)**	**32.9 (26.4, 39.3)**	**< 0.0001**
MCS	46.1 (46, 46.2)	47.9 (45.1, 50.7)	45.6 (44.4, 46.8)	40.6 (33, 48.1)	0.2341	46 (45.8, 46.1)	47.7 (45, 50.4)	45.8 (44.6, 47)	42 (34.8, 49.2)	0.4195
SF-36V subscales										
PF	**50.4 (50.1, 50.8)**	**39.2 (32.9, 45.5)**	**48.4 (45.6, 51.1)**	**58.5 (40.4, 76.6)**	**0.0018**	**50.4 (50, 50.7)**	**36.3 (30.5, 42)**	**49.6 (47.1, 52.1)**	**45.8 (29.3, 62.4)**	**< 0.0001**
RP	**48.7 (48.4, 49.1)**	**36.4 (30.1, 42.7)**	**47.4 (44.6, 50.1)**	**48.3 (30.2, 66.4)**	**0.0014**	**48.6 (48.4, 49)**	**34.3 (28.4, 40.3)**	**48.6 (46, 51.2)**	**38.9 (21.9, 55.9)**	**< 0.0001**
BP	**49.6 (49.4, 50)**	**36.9 (31.5, 42.2)**	**47.3 (45, 49.6)**	**42.2 (27, 57.3)**	**< 0.0001**	**49.7 (49.3, 49.9)**	**36 (30.8, 41.2)**	**48 (45.8, 50.1)**	**41.3 (26.5, 56.1)**	**< 0.0001**
GH	**49.4 (49.1, 49.7)**	**41.8 (36.9, 46.7)**	**47.7 (45.6, 49.8)**	**49.3 (35.4, 63.2)**	**0.0089**	**49.3 (49, 49.5)**	**40.7 (36.1, 45.4)**	**48.7 (46.7, 50.7)**	**46 (32.8, 59.2)**	**0.0042**
VT	44.4 (44.1, 44.6)	40.8 (36, 45.6)	43.8 (41.7, 45.8)	36.8 (23, 50.4)	0.3014	44.4 (44.1, 44.6)	40.4 (35.7, 45)	44.6 (42.6, 46.6)	35.8 (22.6, 49)	0.2103
SF	62.6 (62.3, 62.9)	58 (51.8, 64.1)	61.6 (58.9, 64.2)	51.1 (33.5, 68.8)	0.22	62.6 (62.3, 62.9)	57.3 (51.4, 63.2)	62.5 (60, 65.1)	50.5 (33.4, 67.6)	0.18
RE	64 (63.6, 64.3)	64.4 (57.8, 70.9)	62.5 (59.8, 65.3)	57.6 (39.2, 75.9)	0.69	63.9 (63.5, 64.2)	62.1 (55.9, 68.5)	63.5 (60.9, 66.2)	51.8 (34.2, 69.3)	0.53
MH	66.9 (66.7, 67.2)	68.1 (63.4, 72.7)	66.1 (64, 68.1)	61.3 (48.4, 74.1)	0.65	66.8 (66.5, 67)	67.9 (63.5, 72.3)	66.5 (64.6, 68.5)	64.5 (52.3, 76.8)	0.93
% with difficulty in each ADL										
Bathing	**24 (23.6, 24.5)**	**36.4 (27, 46.9)**	**26 (22, 30.1)**	**20 (5, 54.1)**	**0.056**	**25.7 (24, 27.4)**	**41.2 (30.8, 52.4)**	**26.8 (22.6, 31.5)**	**29.5 (8, 66.6)**	**0.0265**
Dressing	**22.4 (22, 22.9)**	**42.7 (32.9, 53.1)**	**23.6 (20, 27.6)**	**20 (5, 54.1)**	**0.0004**	**22.1 (20.5, 23.6)**	**43.8 (33.5, 54.6)**	**22.6 (18.8, 26.9)**	**23.7 (6.1, 59.8)**	**0.0002**
Eating	12.6 (12.2, 13)	22.1 (14.6, 32.1)	10.9 (8.3, 14.1)	18.1 (4.5, 50.7)	0.0572	**14 (12.8, 15.3)**	**25.6 (16.9, 36.7)**	**11.8 (8.9, 15.4)**	**21.7 (5.6, 56.5)**	**0.0265**
Getting in/out of chair	**38.4 (37.9, 38.9)**	**55.1 (44.6, 65)**	**42.7 (38.3, 47.3)**	**54.5 (26.8, 79.7)**	**0.002**	**38.8 (37, 40.6)**	**57.4 (46.7, 67.5)**	**42.3 (37.5, 47.3)**	**64.1 (35, 85.5)**	**0.0006**
Walking	**50.6 (50, 51.1)**	**68.9 (58.6, 77.6)**	**54.8 (50.3, 59.3)**	**54.5 (26.8, 79.7)**	**0.0013**	**53.7 (52, 55.6)**	**74 (64.1, 81.9)**	**56.6 (51.6, 61.4)**	**67.2 (38.1, 87.1)**	**0.0005**
Using toilet	14.9 (14.6, 15.3)	25.3 (17.2, 35.4)	16.2 (13.1, 20)	18.8 (4.5, 50.7)	0.0754	13.7 (12.5, 15.1)	24.4 (16.4, 34.7)	14.5 11.5, 18.2)	21.6 (5.5, 56.4)	0.0508
Number of ADL with limitation	**1.6 (1.6, 1.6)**	**2.5 (2.1, 2.9)**	**1.7 (1.5, 1.9)**	**1.8 (0.7, 2.9)**	**< 0.0001**	**1.6 (1.6, 1.6)**	**2.5 (2.1, 2.9)**	**1.7 (1.5, 1.8)**	**2.1 (1, 3.2)**	**< 0.0001**

Bold values represent statistically significant results. † Multivariable regression models adjusted for the following variables: age, sex, race, education level, marital status, employment status, comorbidity, and current smoking status. AS: ankylosing spondylitis; PsA: psoriatic arthritis; ReA: reactive arthritis; VR36: Short-Form-36; PCS: physical component summary; MCS: mental component summary; ADL: Activity of daily living; PF: physical functioning; RP: role physical; BP: bodily pain; GH: general health; VT: vitality; SF: social functioning; RE: role emotional; MH: mental health.

HRQOL in patients with AS and PsA, respectively. In general, a significant proportion of variability was explained by the regression models (R^2 ranging from 0.21 to 0.65). In patients with AS, severe limitations in ADL were significantly associated with lower PCS score, and being retired with better MCS scores (Table 3). In patients with PsA, more ADL limitations were significantly associated with lower PCS and MCS scores, and unemployed status with lower PCS scores (Table 4).

DISCUSSION

Our study demonstrated significantly more ADL limitations and poorer HRQOL in a population-based sample of patients with AS, PsA, and ReA compared to those without SpA and to age-sex-matched US norms. Certain ADL were more limited in patients with SpA than others, i.e., patients with AS, PsA, and ReA reported more limitations in walking, dressing, and transferring than non-SpA patients. Since we used a generic measure of function, i.e., Katz ADL index, we could compare the ADL limitation rates to age-matched US cohorts, which revealed significantly more ADL limitations in our SpA cohorts. That patients with AS, PsA, and ReA report statistically significantly and clinically meaningful lower physical HRQOL domain scores compared with non-SpA patients, but similar psychosocial HRQOL, indicates that the major morbidity related to these

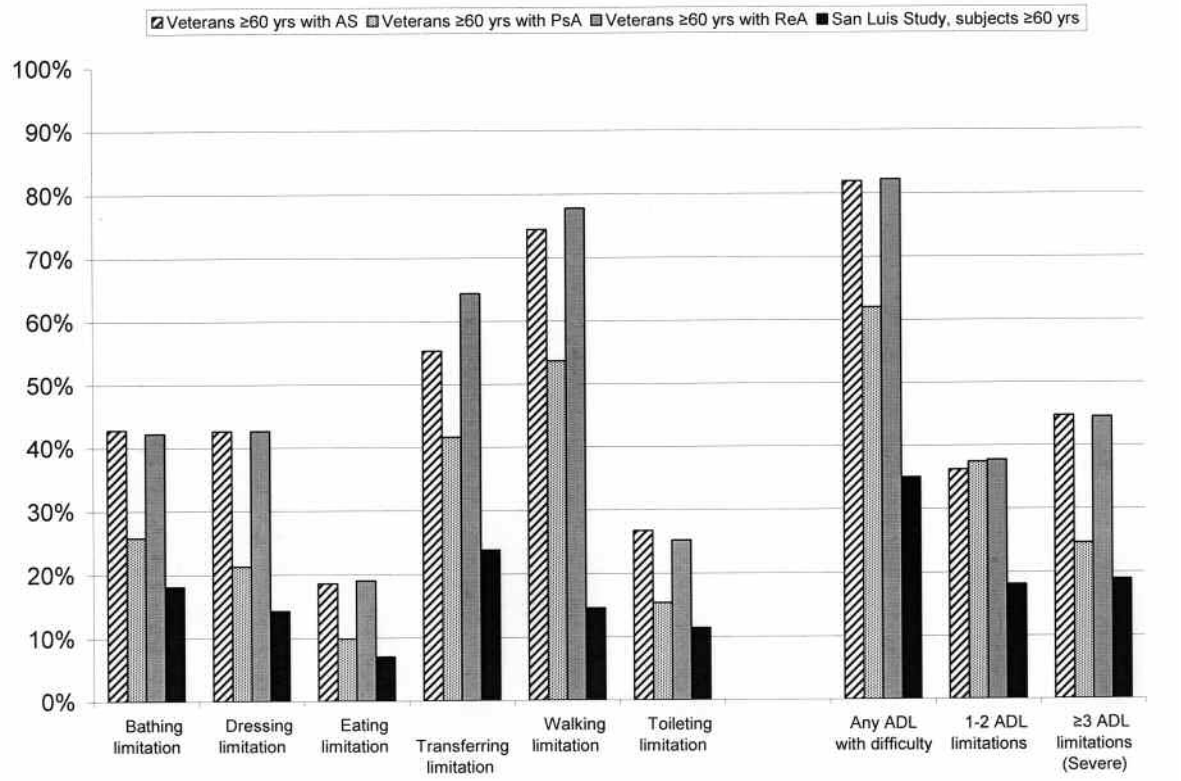

Figure 1. Activities of daily living (ADL) limitations in patients with ankylosing spondylitis (AS), psoriatic arthritis (PsA), and reactive arthritis (ReA) age 60 years and older compared to a US cohort from San Luis Valley, CO, of similar age. Patients with AS, PsA, and ReA were 1.4–3 times as likely as the age-matched San Luis Valley cohort to have limitation of each ADL and 3.7–5.3 times as likely to have walking limitation. Overall ADL limitation was 1.3–2.3 times as likely as that of the US cohort. In general, differences were most marked for patients with AS and ReA.

conditions is physical. These observations confirm earlier similar findings of lower reported physical HRQOL in patients with AS[15,16,19,40,41] and PsA[14,18], and extend these to the veteran population. To our knowledge, this is the first study describing HRQOL and functional status of US veterans with SpA.

Our study has several limitations. The results may not be generalizable to community-dwelling non-veterans with SpA, or to other VA networks, due to geographical differences and nonresponse bias. However, there are fewer generalizability issues compared to previous studies that included patient cohorts from tertiary centers, subject to selection/referral bias due to selection of patients with more severe disease[2,3,8,12,15,18] or clinical trials that usually exclude patients with significant comorbidity. A much higher prevalence of PsA than AS in this cohort may be due to many possible reasons. This includes higher comorbidity in veterans compared to the age-matched general US population[51], the survey being sent only to veterans seeking healthcare (rather than all inhabitants in a geographic area) who are likely to have higher comorbidity, and overcoding of psoriasis patients with joint pain as PsA (and perhaps undercoding of AS). Cross-sectional survey studies have found prevalence of PsA as high as 0.4% in the general population[52]. Although SpA cohorts were identified using ICD-9 codes, we have already demonstrated that the ICD-9 codes have high sensitivity, specificity, and predictive values in our VA databases[32]. We had no data on non-VA diagnoses of SpA. These misclassification biases (including overcoding of PsA) would bias our findings towards null, and therefore would make our estimates conservative. We do not have any information on the severity of comorbidities or SpA or spinal versus peripheral involvement, which would have allowed us to examine the association of disease severity and type of presentation with HRQOL.

The strengths of our study include (1) a large population-based sample; (2) use of generic measures of HRQOL and functional status that allowed comparisons to other matched US cohorts; (3) the robustness of estimates with small changes with multivariable adjustment; (4) adjustment for important confounders including sociodemographics and comorbidity characteristics; and (5) good model-fit for predictors of HRQOL in patients with AS and PsA that explained a large proportion of variability.

Reductions in PCS are 1 SD lower and in MCS similar to those reported previously in an AS cohort that was 15 years younger with 70% men[40]. This may be due to an older cohort (mean age 58–63 yrs vs 24–51 yrs in earlier studies),

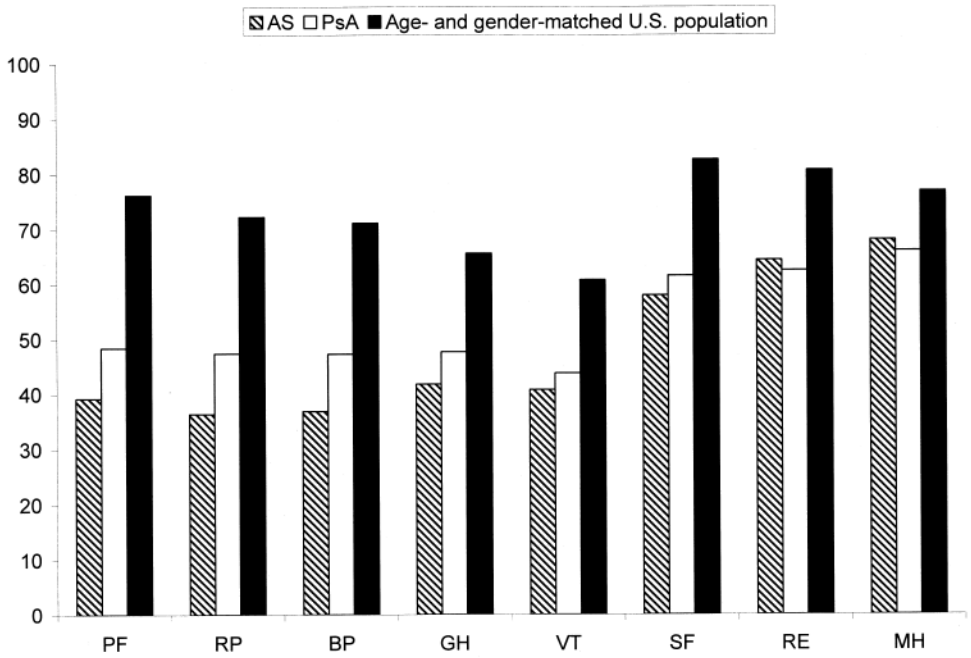

Figure 2. Short Form-36 for Veterans (SF-36V) subscale scores in patients with ankylosing spondylitis (AS) and psoriatic arthritis (PsA) compared to age- and sex-matched US general population. SV-36V scores were lower on all domains in patients with AS and PsA as compared to age- and sex-matched US population norms. Deficits were greater in physical than psychosocial HRQOL domains. PF: physical functioning; RP: role physical; BP: bodily pain; GH: general health; VT: vitality; SF: social functioning; RE: role emotional; MH: mental health.

sex differences (98% vs 63%–93% men), and more comorbidities in veterans compared with the US general population[51]. This signifies that veterans with SpA may have even poorer HRQOL than community-dwelling patients with SpA, confirming a similar finding reported for all veterans versus age-matched US controls[53], a finding likely secondary to higher comorbidity reported in veterans[51].

Our findings of far lower physical HRQOL (34%–50% lower) and lower psychosocial HRQOL (11%–29% lower) in veterans with SpA compared to the age-sex-matched US population are much larger than reported in a clinical trial[16], likely due to lower comorbidity in clinical trial populations and higher comorbidity in our veteran cohorts. Mean PCS scores of 28.9 in AS, 34.1 in PsA, and 36.8 in ReA patients

Table 3. Significant predictors of HRQOL in patients with ankylosing spondylitis in multivariable adjusted analyses*. Only significant predictors are listed in the table.

	PCS Worst Quartile (n = 83)		MCS Worst Quartile (n = 83)	
Model characteristics				
Hosmer-Lemeshow test	13.89 (p = 0.085)		13.53 (p = 0.095)	
Negelkerke R^2	0.598		0.652	
–2 log likelihood	64.65		36.19	
Significant predictors ↓	OR (95% CI)	p	OR (95% CI)	p
ADL limitation		0.001		NS
1–2 ADL limitation	7.2 (0.6, 89)		∞ (0, ∞)	
≥ 3 ADL limitation	74.1 (5.9, 938)		∞ (0, ∞)	
		NS		0.041
Employment status				
Unemployed	0.57 (0.56–5.8)		0.03 (0–1.1)	
Retired	1.88 (0.3–11.1)		0.003 (0–0.17)	

* Multivariable regression models adjusted for the following variables: age, sex, race, education level, marital status, employment status, comorbidity, ADL limitation, and current smoking status. HRQOL: health related quality of life; PCS: physical component summary; MCS: mental component summary; ADL: activity of daily living; NS: not significant (p ≥ 0.05).

Table 4. Significant predictors of HRQOL in patients with psoriatic arthritis in multivariable adjusted analyses[†]. Only significant predictors are listed in the table.

	PCS Worst Quartile (n = 424)		MCS Worst Quartile (n = 424)	
Model characteristics				
Hosmer-Lemeshow test	6.93 (p = 0.544)		8.8 (p = 0.359)	
Negelkerke R^2	0.402		0.21	
–2 log likelihood	362.914		435.68	
Significant predictors ↓	OR (95% CI)	p	OR (95% CI)	p
ADL limitation		< 0.001		< 0.001
1–2 ADL	10.2 (4.3, 24.1)		2.0 (1.5, 4.9)	
≥ 3 ADL	27.1 (11.3, 65)		6.0 (3.2, 11.2)	
Employment status		0.012		NS
Unemployed	3.8 (1.7, 8.5)		1.9 (0.9–3.7)	
Retired	1.6 (0.8, 3.5)		1.1 (0.6–2.3)	

[†] Multivariable regression models adjusted for the following variables: age, sex, race, education level, marital status, employment status, comorbidity, ADL limitation, and current smoking status. HRQOL: health related quality of life; PCS: physical component summary; MCS: mental component summary; ADL: activity of daily living; NS: not significant (p ≥ 0.05).

are very low compared with age-sex-matched US norms. Approximately 6%, 10%, and 13% of the US general population report PCS scores at or below these levels, respectively[50]. On the other hand, MCS scores of 47.9 in AS, 45.6 in PsA, and 40.6 in ReA reflected less decrements in HRQOL; 33%, 28%, and 19% of the general population report MCS scores at or below these levels, respectively[50].

These findings suggest that the major emphasis of comprehensive care of patients with SpA should be aimed at improving physical HRQOL. This may be achieved by prevention, early diagnosis, and treatment of SpA-associated physical morbidity and of associated medical comorbidity, both of which are likely to improve HRQOL and function. These results should prompt more population-based studies of HRQOL in patients with SpA to further understand relationships of predictors of health outcomes. The earlier studies from tertiary care rheumatology practices are skewed towards the more symptomatic patients and therefore are unlikely to give an assessment of burden at the community level, as noted in a comprehensive review[54].

With very few previous studies of HRQOL and functional status in patients with ReA[20], our study provides data that both HRQOL and functional status are diminished in patients with ReA, similar to other SpA. Our study is limited by the small number of patients with ReA. Further studies are needed to better understand these deficits in patients with ReA.

Our finding of the association of more limitations in ADL with poorer HRQOL in AS confirms similar observations in 2 small cohorts of juvenile AS[55] and AS[56]. This adds ADL limitations to the list of significant predictors of HRQOL in AS in multivariable analyses described previously, including current employment, disease activity, coping strategy, fatigue[40], education level[40,41], and female sex[41]. Our findings that more ADL limitations predict poorer physical and mental HRQOL, and unemployed status mental HRQOL, in PsA are novel, and need to be confirmed in future studies. In conjunction with recent findings that function in patients with SpA is a strong correlate of total and direct costs[21-23] and of healthcare utilization[57], this implies that strategies aimed at improving function in patients with SpA (physical and occupational therapy, decreasing disease activity, and optimal control of comorbidity) may improve HRQOL and decrease costs. Our multivariable adjusted models explained a significant proportion of variability, 40%–65%, in PCS and MCS scores in AS and PCS scores in PsA, and had good model-fit characteristics.

This population-based study of US veterans with AS, PsA, and ReA demonstrated functional limitations were higher and physical HRQOL was lower in patients with SpA compared to patients without SpA, even after adjustment for age, sociodemographics, and comorbidities. Functional limitations and HRQOL deficits were far greater than age-matched and age-sex-matched US norms, respectively. We need studies that assess which of the following factors contribute to these differences, including: severity and duration of disease, response to current therapy, treatment-related adverse effects, medical comorbidity, socioeconomic factors, and healthcare access. Many of these factors are modifiable, and targeted interventions can potentially improve function and HRQOL in patients with SpA.

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