Challenges comparing functional limitations in rheumatoid arthritis and ankylosing spondylitis

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ABSTRACT

Whether physical functioning in patients with rheumatoid arthritis (RA) differs from that in patients with ankylosing spondylitis (AS) is presently uncertain. Such a comparison poses challenges, not only because the two diseases differ in the domains of functioning affected, but also because of the different instruments used to measure functional limitations. Limiting our analysis to studies using similar self-report questionnaires, we examined published observational studies of unselected cohorts of patients with RA and patients with AS to compare and contrast the severity of functional limitations. Available studies from a few direct comparisons, and mostly indirect comparisons, suggested that patients with RA are generally more severely limited in physical functioning throughout the disease course than patients with AS. Since most studies did not adjust adequately for potentially important confounders, such as age, gender, comorbidity, and disease duration, reported differences in functional disability between patients with RA and patients with AS must be interpreted cautiously.

Introduction

Rheumatoid arthritis (RA) and ankylosing spondylitis (AS) are two of the most prevalent types of chronic inflammatory arthritis. Because these diseases involve different joint areas, follow dissimilar courses, and preferentially affect different patient populations, they are expected to impact different domains of physical function. In this review, we outline the main instruments used to measure physical function in RA and AS, examine the challenges in comparing these two diseases, and compare the degree of functional limitations in RA and AS.

Physical functioning, a patient-centered measure, is an important component of health status. According to the World Health Organization International Classification of Functioning, Disability and Health (ICF), limitations in physical functioning is viewed as a complex interaction of the whole person (body functions and structures, activities and participation) with societal and environmental influences (contextual factors) (1). To simplify the use of the 1400 classification categories, disease-specific ICF core sets have been proposed that are considered to be the minimum set representative of certain diseases. Core sets for RA and AS have been described (2, 3) but need further validation.

The important role of physical functioning is reflected by its inclusion as a component of response criteria for RA and AS clinical trials (4, 5). Furthermore, physical functioning contributes to disease burden, as discussed by Kiltz and van der Heijde in this issue (6). The degree of functional limitation predicts health care costs in both RA and AS (7-16), and premature mortality in RA (17-20).

Methods used to measure functional limitations

Two approaches used to assess physical function are patient self-report questionnaires and performance measures. Self-report instruments ask respondents to rate their usual ability to perform tasks, typically activities of daily living. As subjective measures, self-report instruments rely on the subjects' perceived difficulty in performing a task, which can be influenced by mood. Some investigators have proposed that direct observation of the performance of a task is a more "objective" measure of physical functioning. However, performance measures, such as timed chair stands or walking speed, may be effort-dependent, and therefore influenced by mood or other confounders. Moreover, the tasks tested in perform-

ance measures may not be relevant in everyday life, and more often measure capacity to perform a specific task than the person's usual abilities. Because studies that assess physical function in the rheumatic diseases use self-report instruments almost exclusively, our review is focused on these measures. Physical performance measures in RA have been demonstrated to have good face validity, reliability, and prognostic utility (18, 21); however, we did not include them due to their undetermined applicability to patients with AS.

Physical function should be distinguished from impairments, such as joint deformities or limitations in the range of motion of peripheral or axial joints. Physical functioning evaluates one's ability to accomplish purposeful tasks. While impairments can be one cause of functional limitations, measures of deformity or flexibility are not measures of physical function. Assessing functional limitations through its downstream consequences, such as work disability, is also limited because many factors other than functional limitations impact these measures.

Main instruments used to measure physical function

Comparison of functional limitations between RA and AS requires that the same measures be used. Because much of the literature on functional limitations in patients with AS uses AS-specific instruments, such as the Bath Ankylosing Spondylitis Functional Index, the Dougados Functional Index, or the Revised Leeds Disability Questionnaire, these studies cannot be used for comparisons. We focus on studies using the Health Assessment Questionnaire (HAQ) and its derivatives, and the Physical Functioning scale of the Short Form-36 (SF-36).

Health Assessment Questionnaire

The HAQ is one of the most widely used patient-oriented questionnaires of physical function (22). The HAQ Disability Index includes 20 items covering 8 domains of functioning (dressing and grooming, arising, eating, walking, hygiene, reach, grip, and usual activities), rated on a 4-level response (without any difficulty, with some difficulty, with much difficulty, and unable to do). The score can range from 0 to 3, with higher scores indicating more limitations.

Health Assessment Questionnaire for Spondyloarthropathies

A HAQ for the Spondyloarthropathies (HAQ-S) was devised to address concerns that the HAQ did not include all domains of functioning relevant to patients with spondylitis (23). The HAQ-S adds 2 domains to the original HAQ, consisting of 5 items that assess posture-associated activities and driving. Item scoring and possible range (0–3) are the same as the original HAQ. The HAQ-S is useful because the original HAQ can be calculated from it, thereby allowing comparison across diseases.

Modified Health Assessment Questionnaire

The modified HAQ (MHAQ) is an abridged version of the HAQ and contains only 8 of the original 20 questions (24). The score is the mean of responses to the eight questions, with a range from 0 to 3 (or 1 to 4). Although faster to complete, the MHAQ is more limited by floor effects than the original HAQ. Floor effects may arise when fewer questions are presented, because limitations in some omitted functions are not captured.

Hannover Functional Status Questionnaire

The Hannover Functional Status Questionnaire (FFbH) is a functional disability self-report questionnaire both highly correlated (r=0.87) and transformable to the HAQ (25). The FFbH assesses limitations with activities of daily living, and the total score represents the percent of full function (range from 0 to 100).

Short Form 36

The Short Form 36 (SF-36) is a generic 36-item health status questionnaire that is structured into an 8-scale profile (26). The SF-36 contains scales on physical functioning, vitality, pain, general health perceptions, physical role functioning, emotional role functioning, social role functioning, and mental health. The physical functioning scale contains 10 items on ability to perform activities of daily living, with a range from 0 (worst) to 100 (best).

Challenges in comparing functional limitations between RA and AS

Despite the similarities that RA and AS share as chronic systemic inflammatory rheumatic diseases, they have many substantive differences. RA and AS differ in the pattern of involved joints and therefore would be expected to impact different domains of physical functioning. RA affects primarily small peripheral joints, while AS involves predominantly the axial skeleton and entheses. Accordingly, RA would be expected to impact functions that depend on use of the hands, wrists, and feet, such as dressing and grooming, eating, gripping, and walking. In contrast, AS would be expected to affect primarily functions that depend on whole body or head movement, such as bending, crouching, reaching up, and driving. Comparison of the impact of each disease on physical functioning is therefore more challenging than would be the case if similar distributions of joints were affected.

Moreover, the reported severity of functional limitations depends on the types of functions assessed in different questionnaires. If a questionnaire predominately assesses functions mediated by peripheral joints, and functions mediated by the axial skeleton are underrepresented, then patients with conditions that involve peripheral joints may register more limitations, simply as a result of the spectrum of activities assessed. The HAQ has been noted to focus more on hand and upper extremity functions, and this focus may contribute to higher scores among patients with RA compared to patients with AS. AS-specific questionnaires, such as the HAQ-S, were developed to address these differences in the spectrum of affected functions across diseases. Differences in gender and age between patients with RA and AS also confound comparisons of crude scores. Women and older individuals with more comorbid diseases tend to report more limitations than men or those without comorbidity;

these factors also favor higher scores in RA than AS. For proper comparisons, results that are stratified or adjusted for gender and age are needed.

Because functional limitations tend to increase with the duration of RA and AS, measures of functional limitations should also be stratified by duration of disease for optimal comparisons. Reporting of mean (or median) scores for a cohort of patients with a wide range of durations of disease is less informative than reporting scores in narrow bands of duration. Furthermore, the causes of functional limitations vary depending on where the patient lies in the disease course. Physical functioning in early RA is likely measuring impairment from active synovitis (a reversible cause of functional limitations), while physical functioning in late RA is likely measuring impairment from both chronic damage of the joints, tendons, and muscles (an irreversible cause) and disease activity (27-29). The relative impact of symptoms and damage on functioning may differ in patients with RA and AS. In a study of patients with AS, Landewe and colleagues reported that functional impairment was determined independently by both disease activity and radiographic damage of the cervical and lumbar spine (30).

With these considerations, we searched the English-language literature for observational studies of unselected cohorts of patients with RA or AS that reported results for either the HAQ (or HAQ-S) or SF-36 physical function score. We excluded studies that focused on particular subsets of patients (*e.g.* early RA cohorts, treatment registries, or interventional studies) because these samples introduced additional confounders (*e.g.* disease duration or disease activity) that further complicated comparisons between RA and AS. We included all AS studies but only RA studies of at least 200 subjects. Because no studies reported rates of progression of functional limitation in AS over time, we did not include RA studies that reported these results. Although our search was intended to be complete, we cannot guarantee that we identified all relevant studies, particularly RA studies in which physical function scores might have been incidentally noted. We organized studies into two types: those that directly compared physical functioning between patients with RA and patients with AS recruited using the same procedures, and those that reported physical functioning in patients with RA or AS patients alone. We tabulated the latter studies for indirect comparisons.

Studies of direct comparisons

Three of the six studies that directly compared functional limitations between patients with RA and patients with AS examined subjects in the German national rheumatic disease databank (Table I). Zink and colleagues abstracted data of outpatients with inflammatory rheumatic diseases at 21 arthritis centers in Germany between 1993 and 1997 (31). Among 52,444 patients with RA and 8,776 patients with AS, patients with RA were nearly 13 years older than patients with AS. More women than men had RA, but significantly more men than women had AS. In both disease groups, functional limitations were associated with age, gender, and disease duration. In this study, severe functional disability was reported as <50% of full functional capacity on the FFbH. For each age/gender subgroup, a larger proportion of patients with RA than patients with AS had severe functional disability, although many proportions were only slightly larger in patients with RA. A larger proportion of older patients with RA or AS experienced severe functional disability than their younger counterparts. For the same age range, women systematically reported more severe functional disability than men. Because the measure of functional limitations was dichotomized (high versus low), this study does not provide information on the relative distribution of limitations between RA and AS among patients with milder degrees of limitation.

Using the same database, Huscher and colleagues studied costs of illness in patients <65 years of age (32). Patients with RA were on average older than patients with AS (Table I). A larger proportion of patients with AS had disease duration >10 years (61.9% versus 42.3%, respectively). In an unadjusted comparison, a slightly higher proportion of patients with RA reported moderate functional disability, as represented by a HAQ score >1.7.

The third analysis of the German Collaborative Arthritis Centres databank compared quality of life and treatment among patients with psoriatic arthritis, RA and AS (33). As in the previous studies, patients with RA were older, more likely women, and had a shorter disease duration than patients with AS (Table I). In unadjusted comparisons, the proportion of patients with severe functional disability (represented by a score of <50 on the FFbH) was slightly higher among those with RA than AS. About one-half of patients in each group had a HAQ >1.0.

In a Norwegian study (34), patients with RA and AS from a medical center-based register were surveyed regarding their satisfaction with medical care. Patients with RA were older and more likely women than patients with AS (Table I). Mean MHAQ scores were significantly higher among patients with RA than patients with AS.

Chorus and colleagues compared health-related quality of life in patients with RA and patients with AS from a Dutch nationwide register (35). Data were from random samples of patients age 16-59 in 1996-1997 (Table I). Mean disease duration was slightly higher in patients with AS. The mean physical functioning subscale score of the SF-36 was 15 points lower (indicating worse functioning) among men with RA than men with AS. Similarly, women with RA averaged 16 points lower than women with AS.

In an Italian study, Salaffi and colleagues compared health-related quality of life between patients with RA and patients with AS who were randomly selected from among outpatients at a university rheumatology clinic (36). Patients with RA were older and had a shorter disease duration than patients with AS (Table I). Mean scores on the physical functioning subscale of the SF-36 were lower for patients with RA than AS, indicating greater functional limitations in patients with RA.

Collectively, these studies suggest patients with RA have worse functioning

Table I. Comparison of functional limitations in patients with rheumatoid arthritis and ankylosing spondylitis at the same study sites.

Reference	Year	Patients no.	Age* yrs	Men %	Disease duration, yrs*	HAQ*	SF-36 Physical Function*
Zink *et al.* [31]	2000						
RA		52444	57.1 ± 13.4	23	8.7 ± 9.5	Age ≤ 40: (M) 8.4; (W) 10.6† Age 41-50: (M) 15.9; (W) 18.9† Age 51-60: (M) 20.6; (W) 27.9† Age 61-70: (M) 24.3; (W) 36.5† Age > 70: (M) 31.1; (W) 49.9†	
AS		8776	43.9 ± 12.7	69	14.7 ± 11.2	Age ≤ 40: (M) 7.7; (W) 8.8† Age 41-50: (M) 12.8; (W) 16.2† Age 51-60: (M) 16.8; (W) 21.3† Age 61-70: (M) 19.0; (W) 35.2† Age > 70: (M) 28.4; (W) 44.2†	
Huscher *et al.* [32]	2006						
RA		4351	53	21		18.8‡	
AS		827	46	62		16.2‡	
Zink *et al.* [33]	2006						
RA		9627	60	23	11.2	22.0†; 53.6§	
AS		1378	48.7	63	15.5	15.7†; 51.5§	
Kjeken *et al.* [34]	2006						
RA		1041	61.5 ± 15.1	22	14.1 ± 11.3	1.6±0.55¶	
AS		152	46.9 ± 13.1	58	15.2 ± 12.3	1.4±0.43¶	
Chorus *et al.* [35]	2003						
RA		1056	49.0 ± 8.3	28	11.9 ± 9.1		(M) 52.7±27.4; (W) 47.9±26.3
AS		658	43.5 ± 9.4	70	12.3 ± 8.0		(M): 67.8±24.1; (W): 61.3±23.1
Salaffi *et al.* [36]	2009						
RA		469	57.5 ± 14.3	28	6.1 ± 4.2		41.8±20.6
AS		164	51.7 ± 9.2	81	8.2 ± 4.6		52.6±21.2

HAQ: Health Assessment Questionnaire; SF-36 PF: Short Form 36 Physical Functioning subscale; FFbH: Hannover Functional Status Questionnaire; M: Men; W: Women.
*All values are mean ± standard deviation, unless otherwise noted; † Proportion of patients with <50% full functional capacity on FFbH; ‡ Proportion of patients with HAQ >1.7 (transformed values from FFbH scores); § Proportion of patients with HAQ >1 (transformed values from FFbH scores); ¶ Modified Health Assessment Questionnaire (range 1–4).

than patients with AS. The differences were pronounced in studies that compared mean scores of the SF-36, while differences were only slight when disease groups were compared based on the proportion with severe disability on the FFbH. This difference could be due to either the measure used or the choice to dichotomize the results. This choice limits the comparisons that can be made, as we do not know if more patients with AS had little or no functional limitations, and more patients with RA had mild or moderate limitations. The comparisons are also confounded by differences in age, gender and disease duration, the influence of which was addressed in only some studies.

Studies of indirect comparisons

Inferences from indirect comparisons should be made cautiously because of heterogeneity among the cohorts. Studies evaluated patients of different time periods, geographical areas, practice settings, and demographic characteristics (Tables II and III). Overall, HAQ scores were generally higher in patients with RA (HAQ of 1) than patients with AS (HAQ of 0.4). Among patients with AS, scores on the HAQ-S were higher (HAQ-S of 0.8) than scores on the HAQ, but still lower than the HAQ scores of patients with RA. Assessed with the physical functioning subscale of the SF-36, patients with RA generally scored lower than patients with AS, indicating worse functioning.

HAQ and SF-36 physical function scores for patients with RA tended to be lower among more recent cohorts.This observation supports some studies that suggest RA has become milder (37-43). Two studies have reported HAQ scores in a large number of patients with RA, stratified by duration of RA (44, 45). Wolfe and Cathey abstracted data from patients in the Arthritis, Rheumatism, and Aging Medical Information System (ARAMIS) database from 1976 and 1988. Of the 1274 patients, mean (± standard deviation) age was 54.8±14.2 years, and 376 were men (29.5%). In a subsequent study by Wolfe, data from 1843 patients from 1974 and 1999 was abstracted from the same database. Demographic characteristics were similar to the earlier study. In these studies, the HAQ scores at onset of RA ranged from 0.9 to 1.1, and were progressively higher among patients with longer durations of RA (Fig. 1). Women had higher scores than men across all durations of RA.

To provide comparable data for AS, we analyzed data from the PSOAS (Prospective Study of Outcomes in AS) cohort. In this cross-sectional analysis, we computed mean HAQ scores for patients, grouped into 5 year bands of duration of AS. Among the 702 patients with AS, 508 (72.4%) were men. The

Table II. Functional limitations with the Health Assessment Questionnaire in patients with rheumatoid arthritis and ankylosing spondylitis evaluated at different study sites.

	Reference	Year	Patients no.	Age yrs*	Men %	Disease duration, yrs*	HAQ*	MHAQ*	HAQ-S*
RA	Sherrer *et al.*[47]	1986	681	62 ± 13	28	22 ± 12	1.4		
	Sharp *et al.*[48]	1991	292	53.8	33	9.4	1.20		
	Hawley *et al.*[49]	1991	624	58.6 ± 14.0	27	11.5 ± 9.3	1.3 ± 0.78		
	Hochberg *et al.*[50]	1992	325	56.4 ± 13.2	22	–	1.3		
	Gardiner *et al.*[51]	1993	208	55.4 ± 12.7	20	12.3 ± 9.6	1.78 ± 0.75**		
	Reisine *et al.*[52]	1995	392	48 ± 10	28	8.7 ± 7		0.50 ± 0.44	
	Bendtsen *et al.*[53]	1995	222	63.1	24	17.8	1.37¶¶		
	Reisine *et al.*[54]	1995	696	57 ± 10	21	15 ± 9	1.2 ± 0.71		
	Houssien *et al.*[55]	1997	200	58.9 ± 13.3	26	11.3 ± 10.4	1.3 ± 0.9		
	Kvien *et al.*[56]	1998	1030	62.3 ± 14.9	21	12.9 ± 11.4		1.70¶	
	Chorus *et al.*[57]	2000	1056	49.0	28	11.9	1.0		
	Westhoff *et al.*[58]	2000	273	60.7 ± 12.1	23	17 (2-77)§	1.96††		
	Fransen *et al.*[59]	2002	803	59 ± 13	29	7 (2, 14)†	1.0 (0.38,1.63)†		
	Yelin *et al.*[60]	2002	1269	56.7 ± 14.0	23	11.1 ± 10.2	1.2 ± 0.8		
	Lajas *et al.*[11]	2003	201	64.3 ± 11.8	22	7.7 (3.3,14.3)†	1.025 (0.37,1.5)†, †††		
	Dadoniene *et al.*[61]	2003	201◊	55.9 ± 10.0	17	11.9 ± 9.5		2.3 ± 0.8¶	
	Russak *et al.*[62]	2003	291	57 ± 14	15	12.7 ± 9.9	0.73 ± 0.69		
	Krishnan *et al.*[63]	2004	6436	58.5†	26	8.0 (2.3,16.7)†	1.13 (0.5,1.8)†		
	Escalante *et al.*[64]	2004	776	57†	30	8†		1.89 ± 0.70¶	
	Wolfe *et al.*[65]	2004	14038	–	–	–	1.09 ± 0.72	0.51 ± 0.49	
	Pincus *et al.*[66]	2004	1416	56.0	23	11.7		0.6	
	Jawaheer *et al.*[67]	2004	1097	41.0 ± 13.1	23	14.3 ± 11.1	1.0 ± 0.8		
	Sokka *et al.*[68]	2004	1095	62.4 ± 0.4	29	11.3 ± 0.3	0.83 ± 0.02		
	Lacaille *et al.*[69]	2004	581	48	21	9.8	1.1		
	Leeb *et al.*[70]	2005	207	59.0 ± 12.9	24	7.23 ± 8.24		0.62 ± 0.66	
	Marra *et al.*[71]	2005	313	61.5 ± 25.9	22	13.9 ± 11.4	1.10 ± 0.77		
	Krishnan *et al.*[72]	2005	1530	55.4 ± 14.9	28	–	0.25		
	Armstrong *et al.*[73]	2005	253	62.0 ± 11.2	28	13.4 ± 10.2	1.86 ± 0.78		
	Aletaha *et al.*[74]	2005	767	54.1 ± 14.9	20	8.1 ± 10.6	0.875 (0.25, 1.5)†		
	Cole *et al.*[75]	2005	278	51 ± 13	-	8.7 ± 10	1.17 ± 0.70		
	Solomon *et al.*[76]	2005	359	56 (25-90)‡	16	10 (0.6-58)‡	1.17 ± 0.96		
	Wolfe *et al.*[77]	2005	669	58.0 ± 13.5	27	12.5 ± 10.5	1.06 ± 0.75	0.49 ± 0.51	
	Cranney *et al.*[78]	2005	520	58.5 ± 11.2	30	15.5 ± 12.8	0.97 ± 0.72		
	Baddoura *et al.*[79]	2006	298	51.5 ± 14.7	22	8.9 ± 8.7		0.62 ± 0.65	
	Koh *et al.*[80]	2006	401	57 ± 10.9	14	11 ± 13	0.56 ± 0.66***		
	Rupp *et al.*[81]	2006	307	58.1 ± 13.4	29	6.4 ± 7.6	0.46 ± 0.48‡‡		
	Ariza-Ariza *et al.*[82]	2006	300	59.6 ± 13.3	18	10.3 ± 8.7	1.2 ± 0.9		
	Fronseca *et al.*[83]	2007	491	57 ± 13.3	15	12.7 ± 10.5	1.2 ± 0.8		
	Treharne *et al.*[84]	2007	348	61.4 ± 11.7	28	13.1 ± 11.0	1.40 ± 0.93		
	Panoulas *et al.*[85]	2007	400	63.1§	27	10 (4,18)†	1.5 (0.63, 2.13)†		
	Scott *et al.*[86]	2007	321	60	24	9 (1-48)‡	1.5 ± 0.8		
	Soderlin *et al.*[87]	2007	594	64	27	17	1.1		
	Bansback *et al.*[88]	2007	308	61.4 ± 13.7	22	14 ± 11.6	1.11 ± 0.77		
	Shanahan *et al.*[89]	2008	497	51.8	30	10.7 (0-48)‡	0.63§		
	Uhlig *et al.*[40]	2008	914	58.7 ± 13.4	21	13.6 ± 10.5		1.55¶	
	Momohara *et al.*[90]	2008	5497	55.7 ± 13.2	18	8.0 ± 8.4	0.78 ± 0.72§§		
	Bodur *et al.*[91]	2008	562	52.1 ± 12.6	21	9.8 ± 8.1	0.74 ± 0.75◊◊		
	Khanna *et al.*[92]	2008	307	59.4 ± 13.2	17	14.1 ± 11.5	0.84 ± 0.75		
	ten Klooster *et al.*[93]	2008	472	59.6 ± 14.2	30	10.5 ± 11.2	1.1 ± 0.7‡‡		
	Sokka *et al.*[94]	2009	6004	56.2	21	11.2	0.9		
	Lee *et al.*[95]	2009	7413	60.3 ± 12.8	24	12†	0.4 ± 0.5		
AS	Daltroy *et al.*[23]	1990	44	38.5 ± 11.9	75	13.7 ± 9.8	0.38 ± 0.49		0.49 ± 0.50
	Hidding *et al.*[96]	1994	144	42.5 ± 10.4	78	4.0 (0-32)§			0.31 (0-1.46)§
	Cury *et al.*[97]	1995	15	34	–	14			1.2 (0.1-2.1)‡
	Ward *et al.*[98]	1999	216	47.4 ± 13.8	67	20.0 ± 13.7	0.375 (0.125,0.875)†		0.5 (0.2, 1.0)†
	Ward[16]	2002	241	47.1 ± 13.8	69	19.8 ± 13.8			0.69 ± 0.6
	Heikkila[99]	2002	65	49 ± 11	68	23 ± 11			0.99 ± 0.63
	Ward *et al.*[46]	2005	326	55.0 ± 10.7	74	31.7 ± 10.2			0.80 ± 0.6

HAQ: Health Assessment Questionnaire; MHAQ: Modified Health Assessment Questionnaire; HAQ-S: Health Assessment Questionnaire for the Spondyloarthropathies; SF-36 PF: Short Form 36 Physical Functioning subscale; *All values are mean ± standard deviation, unless otherwise noted; † Median with interquartile range; ‡ Mean with total range; § Median (with total range, if available); ¶ MHAQ range 1 – 4; ◊ Vilnius cohort; ** British adaptation of the HAQ; outpatient cohort; †† HAQ score transformed from Hannover Functional Status Questionnaire score; ‡‡ Dutch adaptation of the HAQ; §§ Japanese adaptation of the HAQ; ¶¶ Swedish adaptation of the HAQ; ◊◊ Turkish adaptation of the HAQ; *** Chinese adaptation of the HAQ; ††† Spanish adaptation of the HAQ.

Table III. Functional limitations with the Short Form 36 in patients with rheumatoid arthritis and ankylosing spondylitis evaluated at different study sites.

	Reference	Year	Patients no.	Age yrs*	Male %	Disease Duration, yrs*	SF-36 Physical Function
RA	Ruta *et al.*[100]	1998	233	56 ± 14	19	13 ± 13	31 ± 29
	Fransen *et al.*[59]	2002	803	59 ± 13	29	≠7 (2, 14)†	55 (33.3, 80)†
	Dadoniene *et al.*[61]	2003	201◊	55.9 ± 10.0	17	11.9 ± 9.5	35.2 ± 25.2
	Wolfe *et al.*[65]	2004	14038	–	–	–	47.1 ± 28.4
	Escalante *et al.*[64]	2004	776	57†	30	8†	35.6 ± 27.9
	Koh *et al.*[80]	2006	401	57 ± 10.9	14	11 ± 13	64.5 ± 28.1***
	Rupp *et al.*[101]	2006	882	59.8 ± 14.8	28	8.9 ± 9.8	49.0 ± 27.2
	Soderlin *et al.*[89]	2007	594	64	27	17	49
	Uhlig *et al.*[40]	2008	914	58.7 ± 13.4	21	13.6 ± 10.5	54.5
	Alishiri *et al.*[102]	2008	411	46.8 ± 12	13	6.3 ± 5.7	50.9 ± 26.4
AS	Ward[103]	1999	175	51.1 ± 14.0	68	23.7 ± 14.3	66 ± 27
	Dagfinrud *et al.*[104]	2004	314	43.7 ± 12.3	63	13.3 ± 11.3	71 ± 23
	Turan *et al.*[105]	2007	46	39.2 ± 11.5	80	13.9 ± 10.4	62.4 ± 25.9
	Zhu *et al.*[12]	2008	145	40 ± 11.1	79	10 ± 7.9	65
	Vesovic-Potic *et al.*[106]	2009	74	48.5 ± 10.3	78	15.2 ± 8.8	64.4 ± 16.7

SF-36 PF: Short Form 36 Physical Functioning subscale; * All values are mean ± standard deviation, unless otherwise noted; † Median with interquartile range; ◊ Vilnius cohort;*** Chinese adaptation of the SF-36.

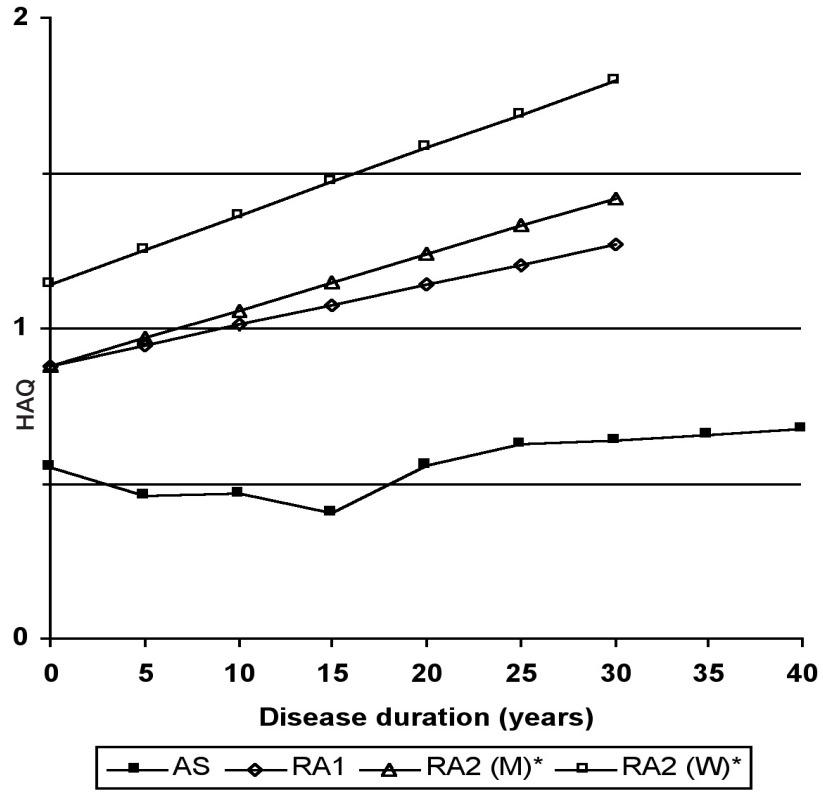

Fig. 1. Comparison of mean Health Assessment Questionnaire scores by disease duration between rheumatoid arthritis and ankylosing spondylitis.

HAQ: Health Assessment Questionnaire
AS: Ankylosing Spondylitis Cohort (unpublished data)
RA1: Rheumatoid Arthritis Cohort 1 [44]
RA2: Rheumatoid Arthritis Cohort 2 [45]
M: Men
W: Women
*Values represent group medians

mean HAQ was 0.55±0.62 at onset, and scores were only slightly higher in subgroups with longer duration of AS. At 20 years of AS, mean HAQ was 0.56±0.55, and at 40 years of AS the mean HAQ was 0.67±0.67. In this indirect comparison of HAQ stratified by duration of disease, functional limitations appeared to be greater among patients with RA than patients with AS throughout the disease course.

Comparisons across studies should be interpreted cautiously. Patients with AS were generally younger than patients with RA, and age has been shown to be an important independent predictor of functional decline. Given the older age of those with RA, they will likely have more comorbidities which could also contribute to functional limitations. Women predominate among those with RA and men predominate among those with AS. Women have been noted to report greater functional limitations than men in RA (45) and AS (46), although this observation may be due to ascertainment bias or confounding rather than a true gender difference.

Conclusions

Given the differences between RA and AS, comparison of functional limitations between these two diseases is challenging. In general, the evidence suggests that functional limitations are more severe in patients with RA than

in patients with AS. However, this conclusion is tempered by several caveats. The scope of functional limitations in RA and AS is determined by differences in the distribution of involved joints. Few studies have directly compared functional limitations in these patients, and few have adjusted for potential confounding by age, gender, comorbidity, or disease duration. Therefore, perceived differences should be viewed cautiously. In future studies, we may learn that after controlling for differences in age, comorbidity, duration of disease, disease severity, and treatment, patients with RA have worse functional disability than patients with AS. Functional limitations are one component of the burden of disease, and have prognostic importance. Knowledge of differences in functional limitations between patients with RA and AS is useful for future healthcare resource planning. Functional limitation is also a modifiable outcome of disease, and provides a measure of progress in developing and disseminating effective treatments.

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