Impact of illness and variables associated with functional impairment in Chinese patients with psoriatic arthritis

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Abstract

Objectives

To assess the impact of disease and functional outcomes in Chinese patients with psoriatic arthritis (PsA) and to identify variables associated with poor functional outcomes.

Methods

A cross sectional study performed in 80 consecutive patients with PsA from a single center. Functional outcomes were assessed by the Health Assessment Questionnaire (HAQ) and the Bath Ankylosing Spondylitis Functional Index (BASFI). Clinical variables included social-demographic characteristics and clinical features. Linear regression analyses were performed to identify variables associated with functional impairment.

Results

Thirty-six men and 44 women with mean (±SD) age and duration of arthritis of 48.6 (±13.0) and 10.2 (±6.9) years were studied. One-third reported PsA related unemployment and change in job nature. Another third experienced a reduction of income due to PsA. The median (IQR) HAQ and BASFI were 0.44 (1.09) and 2.1 (4.38). These functional scores correlated highly with each other and with the patient's perception of health, but correlated only moderately or poorly with other disease activity variables. Multivariate analysis identified higher damaged joint count, poorer patients' perception of health, poor socioeconomic factor and higher CRP as factors associated with higher HAQ. Higher back pain score; higher CRP, higher damaged joint count and poor socioeconomic factor were associated with BASFI.

Conclusion

PsA in Chinese subjects has had significant social-economic impact. Joint damage was found to be associated with functional impairment.

Key words

Psoriatic arthritis, physical functioning, Health Assessment Questionnaire, Bath ankylosing spondylitis functional index.

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Introduction

Psoriatic arthritis (PsA) is an inflammatory arthritis associated with psoriasis. It affects young adults in their working ages. It has deleterious effects on patients causing deformities, impaired quality of life and physical functions (1-7). Functional status is a distinct measure of clinical outcome that tells us how patients are performing physically in self-care and social activities. Patient-reported physical functioning is one of the core outcome measures in randomized clinical trials, observational studies and even daily practice. In rheumatoid arthritis (RA) and ankylosing spondylitis (AS), poorer functional status was shown to be an important predictor of social burden and total cost of disease (8-12). Thus, it is important to know the extent of PsA disability on affected individuals and the predictors of poor functional outcomes. Functional scores in PsA were shown to be related to grip strength, fibrositic tender points more than other measures of disease activity (13). A longitudinal study in patients with PsA also revealed that female sex, older age, longer disease duration, higher number of actively inflamed joints and deformed joints predict transition to more severe disability status (6). In an epidemiology study, patients with mainly axial disease were shown to be associated with poorer functional outcomes and higher disease burden (14, 15).

The Health Assessment Questionnaire (HAQ) has been widely used in the field of RA (16). It has been used in PsA populations with some evidence of validity (13, 17). A modification of the HAQ for spondyloarthropathies (HAQ-S) has also been used in a PsA population (18). It behaved similarly to the original HAQ, even in people with axial pattern of disease (13). HAQ has been used for measuring physical function in clinical trials which generally select patients on the basis of peripheral disease activity, and marked improvements in HAQ scores have been seen after effective treatment (19). The Chinese HAQ was validated in a Singapore Chinese RA cohort (20).

The Bath Ankylosing Spondylitis Functional Index (BASFI) is a self-administered questionnaire which consists of 10 items assessing patients' ability in performing activities of daily living. Each item is answered on a 0-100 mm visual analogue scale (VAS). It has been validated and adopted by the ASAS group for measuring functional outcome in AS (21) and has been used in observational trials in spondyloarthropathies, which included patients with PsA with some evidence of validity (22-23).

Data on clinical features of PsA in a Chinese population is scanty (24). There is no data on functional outcomes and the impact of disease in Chinese patients with PsA. This study was undertaken to assess the socioeconomic impact of PsA and the functional status of Chinese patients with PsA, and to identify clinical variables associated with poor functional outcomes measured by HAQ and BASFI.

Methods

Patients

Eighty consecutive patients with PsA followed up in a single rheumatology center were invited for a cross sectional study from January to June 2006, using a standardized protocol. Our center overlooks a population size of 628, 634 and is the only secondary and tertiary rheumatology referral center in the district. Ninety-two patients with PsA were registered in our center. One patient refused, 7 were not available during the study period and 4 were lost to follow-up. All patients were adults, over 18 year-old and fulfilled the Classification of Psoriatic Arthritis (CASPAS) criteria for PsA (25). Their demographic data were recorded.

Clinical variables

Three experienced rheumatologists carried out the clinical assessments. Prior to staring the evaluation, the examiners discussed and negotiated the definition of each test and undertook a formal training session.

The clinical features assessed included swollen, tender and damaged joint count in 66/68/68 diaarthrodial joints, dactylitis count (0-20), enthesitis using the Maastricht Ankylosing Spondylitis Entheses Score (MASES) (26) and fibromyalgia point counts. Damaged joints were defined clinically as joints

ankylosed, loosen, subluxed; or joints which had undergone replacement surgery, arthrodesis, or arthroplasty; or joints having a >20% decrease in range of movement. Joint swelling may be contributing to limitation of movement and may restore when inflammation resolves. Therefore, joints with a reduction of range of movement but have balottable swelling were not counted as damaged. Joints ankylosed or which had undergone surgery for reasons other than PsA such as past injuries were also excluded. The presence of inflammatory back pain was recorded according to the criteria of Calin (27). These criteria define inflammatory back pain with 4 out of 5 of the following characteristics: 1. onset before the age of 40; 2. insidious onset; 3. persistent for more than 3 months; 4. associated with morning stiffness; and 5. improvement with exercise. Metrology measures included modified Schober score, tragus-to-wall distance, spine lateral flexion and chest expansion. Psoriasis was assessed by using the psoriasis area-and-severity index (PASI) (28).

The severities of fatigue, peripheral joint pain, back pain and the patients' perception of health were self reported on a 0-10 visual analogue scale (VAS). Functional scores included HAQ and BASFI. For each item of BASFI, numerical rating scales from 0-10, ranging from "easy" to "impossible" was incorporated instead of the original VAS (29). Quality of life was assessed by the Chinese (Hong Kong) version of Medical Outcomes Study Short Form health survey (SF-36) (30). The norm-based Physical Component Summary scores (PCS) and Mental Component Summary scores (MCS) were then formulated (31). As for employment status, patient were asked whether they were: 1. employed; 2. unemployed; 3. retired; or 4. on sick leave. Unemployment was validated if the patient was available for paid work and had been actively seeking employment in the past month. Socio-economic impact of PsA was assessed by yes/no answers to the following questions: 1. unemployment due to PsA; 2. change of nature of job due to PsA; 3. experienced a reduction in income due to PsA. Radiography of hands and wrists, and sacroiliac joints were taken and the presence or absence of hand and wrist erosions or sacroiliitis were read by a rheumatologist and radiologist blinded to patients' clinical features. The presence of sacroiliitis was defined as grade 2 or above bilaterally or grade 3-4 unilaterally according to New York grading system (32).

The study protocol was reviewed and approved by the Joint Chinese University of Hong Kong-New Territories East cluster (CUHK-NTEC) clinical research ethics committees. Prior to entry to the study, the participants were informed of the nature and purpose of the study.

Statistical analysis

Demographic and clinical characteristics were performed using descriptive parametric or non-parametric statistics as appropriate. Both the HAQ and BASFI scores were not normally distributed. Associations of functional outcomes with potential clinical variables were tested with Mann-Whitney U-test for categorical variables or Spearman's correlations for continuous variables. Variables with a *p*-value <0.05 in the univariate analysis were entered into linear regression analysis using the logarithmic HAQ or BASFI. All hypotheses were 2-tailed and *p*-values <0.05 were considered significant. Analyses were performed using the Statistic Package for Social Science (SPSS for windows, version 10.0 2000, SPSS Inc, Chicago, IL).

Results

Demographic and clinical Data

Thirty-six men and 44 women with PsA were studied. More than half (57.5%) were married, 26.3%, 8.8% and 7.5% were single, widowed and divorced. Primary, secondary and tertiary educations were achieved in 30%, 53.8% and 13.8% of the cohort. The mean (±SD) age of the cohort and age of onset of PsA were 48.6 (±13.0) and 38.3 (±12.6) years. The mean duration of arthritis was 10.2 (±6.9) years. Family history of psoriasis or PsA was reported in 15% of the cohort. According to the subclasses of Moll and Wright, symmetrical polyarthritis, asymmetrical oligoarthritis, spondylosis, distal phalangeal joint involvement only and arthritis mutilans were classified in 45%, 41.3%, 11.3%, 2.5% and 0% res-pectively. Thirty-seven percent had radiographic sacroiliitis. However, only 25% had inflammatory back pain and 8% had sacroiliac tenderness during assessment. Hand-and-wrist erosions occurred in 52.6%. Sixty-three percent had tried disease modifying anti-rheumatic drugs

Table I. Demographic, clinical and social data of PsA cohort (n=80).

Clinical variables		
Age, mean (±SD) years	48.5	(± 13.02)
Women, n (%)	44	(55)
Age of onset of PsA, years (±SD)	38.3	(± 12.6)
Duration of arthritis, years (±SD)	10.2	(± 6.9)
Tried DMARD	50	(62.5)
Currently on DMARD	34	(42.5)
Peripheral joint pain score (0-10), mean (±SD)	4.2	(± 2.50)
Back pain score (0-10), mean (±SD)	3.36	(± 2.86)
Patients' perception of health (0-10), mean (±SD)	4.4	(± 2.35)
PSAI, mean (±SD)	4.89	(± 6.32)
Tender joints (0-68), mean (±SD)	3.5	(± 4.69)
Swollen joints (0-66), mean (±SD)	1.6	(± 2.42)
Damage joints (0-68), mean (±SD)	3.6	(± 4.89)
Erosions, n (%)	40	(52.6)
Sacroiliitis, n (%)	27	(36.5)
HAQ, median (IQR)	0.44	(1.09)
BASFI, median (IQR)	2.1	(4.38)
PCS (0 – 100), mean (±SD)	38.43	(± 10.43)
MCS (0 – 100), mean (±SD)	44.71	(± 10.62)
HK norm-based PCS (mean = 50, SD = 10)	31.72	(± 14.4)
HK norm-based MCS (mean = 50, SD = 10)	46.31	(± 11.6)

Table II. Unemployment rate in PsA cohort compared to the general population in Hong Kong.

	Age groups					
	≤ 29 (n=9)	30-39 (n=5)	40-49 (n=29)	50-59 (n=24)	≥ 60 (n=13)	Overall (n=80)
PsA (%)	33.3	0*	24.1	62.5	23.1	35
General population (%)	5.6	3.4	4.2	5.5	2.5	4.8
Male PsA (%)	20	0*	41.7	88.9	50	47.2
General population (%)	7.3	4.2	4.7	6.3	3.0	5.6
Female PsA (%)	50	0*	11.8	46.7	0	25
General population (%)	4.1	2.6	3.6	4.1	**	3.7

**Statistics are not released due to large sampling error.
*Statistics may subject to error due to small sample size.

Table III. Spearman's correlation of HAQ and BASFI with continuous variables.

	HAQ (95% CI)	BASFI (95% CI)
Age	0.12 (-0.96 – 0.34)	0.04 (-0.18 – 0.26)
Age of onset of PsA	0.05 (-0.18 – 0.29)	-0.07 (-0.30 – 0.17)
Duration of arthritis	-0.06 (-0.29 – 0.19)	0.07 (-0.17 – 0.30)
Peripheral joint pain score	0.44 (0.24 – 0.60)**	0.35 (0.14 – 0.53)**
Back pain score	0.42 (0.21 – 0.58)**	0.49 (0.30 – 0.64)**
Early morning stiffness	0.45 (0.24 – 0.60)**	0.29 (0.08 – 0.48)**
Patients' global	0.54 (0.36 – 0.68)**	0.50 (0.32 – 0.65)**
Tragus-to-wall distance	0.18 (-0.05 – 0.38)	0.23 (0.01 – 0.43)*
Schober	-0.19 (-0.37 – 0.06)	-0.16 (-0.33 – 0.11)
Spinal lateral flexion	-0.21 (-0.41 – 0.02)	-0.30 (-0.49 – 0.09)**
Chest expansion	-0.76 (-0.30 – 0.14)	-0.15 (-0.36 – 0.07)
Tender joints	0.43 (0.23 – 0.59)**	0.24 (0.02 – 0.44)*
Swollen joints	0.09 (-0.13 – 0.31)	0.05 (-0.18 – 0.26)
Damage joints	0.47 (0.28 – 0.62)**	0.432 (0.24 – 0.60)**
MASES	0.27 (0.05 – 0.46)	0.22 (0.004 – 0.42)*
Dactylitis count	0.07 (0.16 – 0.28)	0.05 (-0.18 – 0.26)
Fibromyalgia points	0.34 (0.12 – 0.52)*	0.25 (0.03 – 0.45)*
PASI	0.16 (-0.07 – 0.37)	0.30 (0.08 – 0.49)**
ESR	0.29 (0.07 – 0.48)*	0.20 (-0.02 – 0.40)
CRP	0.414 (0.21 – 0.58)**	0.39 (0.19 – 0.57)**
PCS	-0.8 (-0.87 – -0.70)**	-0.70 (-0.79 – -0.56)**
MCS	-0.33 (-0.51 – -0.12)**	-0.4 (-0.43 – 0.02)*
HAQ	1.00	0.8**
BASFI	0.8**	1.00

*$p < 0.05$, **$p < 0.01$

(DMARDs) while 42.5% were currently on DMARDs, and 11.3% were on two or more DMARDs. The mean active joint count and PASI score tend to be low while a high percentage of the cohort had used DMARDs. Sixteen percent had active disease as defined by those having three or more tender and swollen joints. The demographic data of this cohort is shown in Table I.

Burden of illness

Ninety-one percent of the patients were fully mobile and 8.8% required walking aids. Twenty-eight patients (35%) were unemployed at the time of the survey, while 13.8% were on sick leave. The unemployment rate among patients with PsA was 2-12 fold higher than the age- and sex-matched general population in Hong Kong during the same period (Table II) (33). A third of the cohort reported losing their job, another one-third need to change the nature of their job, and 38.8% experienced a reduction in income as a result of the disease.

Patients with PsA in this cohort had impaired quality of life as compared to the general population in Hong Kong. The norm-based PCS and MCS of SF-36 were below the mean of 50 of the general population. The cohort also has impaired functional status. The Median (IQR) of the HAQ and BASFI were 0.44 (0-1.09) and 2.1 (0.4-4.78). Patients' perception of health and the SF-36 PCS were highly correlated with HAQ and BASFI. Back pain was also highly correlated with BASFI. Other variables including active and damaged joint counts, pain scores and metrology measurements were moderately or poorly correlated with these functional scores (Tables III and IV). In multivariate analysis, damaged joint count, patients' perception of health, poor socioeconomic factor and C-reactive protein (CRP) remained associated with functional impairment by HAQ. Variables associated with BASFI in multivariate analysis included back pain score, damaged joint count, job related reduction in income and CRP (Table V).

Discussion

PsA in Chinese subjects affects adults at working age and thus has significant social and economical impact. The onset of arthritis in our cohort was 38.3 (±12.6) years. However, there is paucity of data among Chinese patients with Psoriatic arthritis (24). In Caucasian countries, disability and the socioeconomical impact has been achieving increasing attention (15, 34). Our study is the first to look into functional disability and socioeconomic impact of PsA in a Chinese population. Up to a third of PsA patients in our cohort reported disease-related unemployment, job nature change and reduction in income. The unemployment rate among these patients was substantially higher than the age- and sex-matched general population. We have shown here that poor functional status was associated with poor working ability.

Table IV. Association of HAQ and BASFI with categorical clinical variables.

	HAQ, median (IQR)	BASFI, median (IQR)
Sex		
Male	0.678 (1.125)	2.45 (4.35)
Female	0.375 (0.969)	1.70 (3.83)
Marital status		
Single	0.63 (1.125)	2.10 (4.70)
Ever married	0.375 (1.00)	2.10 (4.30)
Smoking		
Ever	0.69 (1.00)	2.5 (3.33)
Never	0.375 (1.125)	1.45 (4.48)
Education		
Secondary or below	0.375 (1.125)	2.10 (4.45)
Tertiary	0.625 (0.87)	2.20 (2.40)
Family history		
Yes	0.688 (1.219)	2.5 (4.35)
No	0.378 (1.00)	2.1 (4.1)
Sacroiliitis		
Yes	0.375 (1.125)	2.1 (4.6)
No	0.50 (0.875)	2.1 (3.4)
Erosions		
Yes	0.753 (1.22)	2.45 (4.68)
No	0.25 (0.75)	1.3 (2.63)
Stopped work		
Yes	1.00 (1.37)*	3.7 (4.3)*
No	0.25 (0.875)	1.2 (3.6)
Changed job		
Yes	1.00 (0.874)*	4.25 (3.48)*
No	0.13 (0.844)	1.1 (3.7)
Income reduction		
Yes	0.875 (1.25)*	3.7 (3.6)*
No	0.13 (0.813)	1.1 (3.15)
Ever used DMARD		
Yes	0.69 (1.126)*	2.5 (4.35)*
No	0.13 (0.781)	1.0 (2.73)
Current using DMARD		
Yes	0.63 (1.031)	2.45 (4.55)
No	0.25 (1.125)	1.3 (4.38)
Two or more co-morbidities		
Yes	0.88 (1.25)*	3.0 (4.7)
No	0.25 (0.88)	1.5 (4.3)

*$p<0.05$ by Mann-Whitney U-tests.

Table V. Multivariate regression analysis of variables associated with HAQ and BASFI scores.

	Clinical variables	Beta	*p*-value	Collinearity statistics	
				Tolerance	VIF
HAQ					
	Damage joint count	0.378	0.001	0.905	1.104
	Patients' global	0.323	0.003	0.976	1.024
	Change job	0.246	0.025	0.913	1.095
	CRP	0.228	0.032	0.971	1.030
BASFI					
	Back pain score	0.445	<0.001	0.945	1.058
	CRP	0.356	0.001	0.949	1.054
	Damaged joint count	0.257	0.016	0.904	1.106
	Income reduction	0.224	0.035	0.904	1.106

Clinical variables entered into multivariate analysis:
HAQ: Unemployment due to PsA, Change in job nature due to PsA, Experienced a reduction of income due to PsA, Ever used DMARD, Two or more co-morbidities, Back pain score, Peripheral joint pain score, Duration of early morning stiffness, Patients' perception of health, Tender joint count, Damaged joint count, MASES, Fibromyalgia points, ESR and CRP.
BASFI: Unemployment due to PsA, Change in job nature due to PsA, Experienced a reduction of income due to PsA, Ever used DMARD, Tragus-to-wall distance, Spinal lateral flexion, Back pain score, Peripheral joint pain score, Duration of early morning stiffness, Patients' perception of health, Tender joint count, Damaged joint count, MASES, Fibromyalgia points, PSAI and CRP.

As with other studies, functional status in PsA by both HAQ and BASFI is highly correlated with each other and with the PCS of SF-36. Damage joint count and patients' perception of health were also highly correlated to functional outcomes. While the correlations with other disease activity variables like tender and swollen joint counts, were only moderate. In one study, HAQ was highly correlated with fibromyalgia points, implicating the effect of pain in physical function (13). In our study, fibromyalgia points were only mildly correlated with HAQ and BASFI; and the association disappeared in multivariate analysis.

In multivariate analysis, damaged joint count remained associated with poor functional outcomes assessed by HAQ and BASFI. Disease activity as indicated by swollen and tender joint count may also have an effect on disability. These two variables however, were not associated with HAQ and BASFI in our multivariate analysis even when damaged joint count was removed from the models. Therefore, we could not demonstrate an association between disability and disease activity in a cross sectional manner. This is not an unexpected finding as our cohort consisted of patients with established PsA with a mean arthritis duration of 10 years. Many patients had damaged joints and thus disability as a result of past inflammation rather than current disease activity. In longitudinal studies, female sex, older age, longer duration of illness and a higher number of actively inflamed joints were shown to be associated with deterioration of physical functioning (6, 35).

Damage was assessed clinically in our study. This clinical assessment of damage has been proven to be reliable in PsA in other studies (36, 37). There may be an underestimation of damaged joints as balottable effused joints with reduced range of movement were not counted as damaged joints. The relation between clinical and radiological damage in PsA was addressed in one study (38). Most joints had both clinical damage and radiological damage. Radiological damage is often detected before clinical damage. Radiological

damage was assessed in our study by the presence and absence of erosion and sacroiliitis. However, these were too crude to provide statistical significant association with functional scoring (Table IV).

Our study supports the view that damage is the major determinant for poor physical function in PsA. Measures to reduce damage are therefore pivotal in preventing disability. In many studies, joint inflammation was the major determinate for damage in PsA (38-40). This supports continuous treatment for clinical inflammation in preventing further damage. Driven by the introduction of highly effective treatment, there has been growing interest in achieving "remission" in PsA. The aim of achieving a low level of disease activity is to minimize disease progression and the related damage and to optimize functional status and QoL (41).

The major limitation of our study is its cross sectional study design. We could only demonstrate the association of poor functional outcomes with clinical variables but could not tell the direction of the relation. Neither could we show the effect of variables and functional outcomes with time. The differential effect of disease activity and damage on physical function should be better assessed in longitudinal manner. Nevertheless, the effect of damage on physical function in PsA was clearly shown.

The other limitation of the current study is lacking detailed radiological scoring. Patients having erosions had higher HAQ and BASFI scores, but not reaching statistical significance. Detailed radiological scoring of erosions may give additional information regarding its relation with functional outcomes.

Currently, there is no consensus on how to assess spinal function in PsA. The HAQ-S is a modification of the original HAQ for spinal function. However, it was found to behave similarly to the original HAQ, even in people with axial pattern of disease (13). BASFI has been used in observational trials in spondyloarthropathies with some evidence of validity (22, 23). It may be useful in the assessment of spinal function in PsA. In this study, we have shown its performance among PsA patients. Moderate to high correlation between BASFI and back pain score was noted. Further studies on the detail construct of BASFI in PsA are required.

In conclusion, PsA in Chinese patients has significant social and economic impact. Joint damage was an important association factor with poor physical function in PsA. Other factors associated with poor functional outcomes included pain scores, patients' perception of health and poor socioeconomic factors.

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