Work Disability in Patients with Ankylosing Spondylitis

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ABSTRACT. ***Objective.*** To determine the prevalence of work disability in Spanish patients with ankylosing spondylitis (AS) and to identify factors related to it.

Methods. A cross-sectional study based on data from Regisponser (National Spanish Registry of Patients with Spondyloarthropathy). Demographic and disease-related variables were collected. AS patients were classified as work-disabled according to the Spanish Social Security System criteria. Variables that discriminated between AS patients with and those without work disability were identified using chi-square test or unpaired t test when appropriate. Multiple logistic regression was performed.

Results. In total 699 AS patients, age 48.7 ± SD 12.7 years and with disease duration 14.1 ± 10.1 years, were analyzed; 179 patients (25.6%) had permanent work disability. Several variables had significantly different values in patients with compared to those without work disability. In the regression model (pseudo $R^2 = 0.26$, $p < 0.0001$), age ($p = 0.001$), sex ($p = 0.04$), disease duration ($p = 0.006$), total Bath AS Radiological Index ($p = 0.007$), Bath AS Functional Index (BASFI; $p = 0.007$), and chest expansion ($p = 0.03$) retained an independent association with work disability. When BASFI was excluded from the model the independent association with sex did not remain, and a significant association with finger to floor distance was found ($p = 0.040$).

Conclusion. The prevalence of permanent work disability in Spanish patients with AS is significant, and the main factors related to it are age, disease duration, structural damage, and physical functioning. Longitudinal studies are needed to confirm these results. (First Release Oct 15 2009; J Rheumatol 2009;36:2512–16; doi:10.3899/jrheum.090481)

Key Indexing Terms:
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Ankylosing spondylitis (AS) is a chronic inflammatory disease that can cause several functional limitations, with significant impairment in patients' ability to perform daily activities, including work tasks[1]. Indeed, work productivity is a relevant outcome with important consequences related to the patient's health-related quality of life (HRQOL) and costs of the disease. Several studies have analyzed the influence of AS on patients' ability to work[2-11]. Studies found a variable but significant prevalence of work disability, higher than expected in a matched general population[3,9,11].

Regisponser is the National Spanish Registry of Patients with Spondyloarthropathies, including AS[12]. It contains data about more than 1000 patients, including disease-related variables and work outcomes, allowing analysis of work outcomes and related variables in Spanish patients with AS.

The aims of our study were to determine the prevalence of work disability in Spanish patients with AS and to identify the main factors related to it.

MATERIALS AND METHODS

This was a cross-sectional study based on data from the Regisponser. The registry was launched in 2004 by the Spondyloarthropathies Study Group of the Spanish Society of Rheumatology (GRESSER). Ten tertiary care centers accepted the invitation to participate in the registry. It contains data from patients who fulfilled the classification criteria of the European Spondylarthropathy Study Group (ESSG)[13]; all patients gave consent to be

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included in the registry. Collected data include demographic and disease-related and work-related variables.

Data available in April 2007 were used in this study. Patients with diagnosis of AS according to the modified New York criteria[14] were studied. The primary outcome was the frequency of work disability, as defined by criteria of a damage evaluation unit of the Spanish Social Security System. Patients who had had a finding of "permanently work disabled" and received a disability pension were classified as work-disabled. Variables collected for purposes of this study included patient's age, sex, disease duration, patient and physician global disease activity assessments measured using a visual analog scale (VAS) scored from 0 (very well) to 10 (very bad), patient pain assessment, and patient night pain assessment on a VAS from 0 (none) to 10 (maximum pain). Disease activity and physical functioning were assessed with the Spanish versions of the Bath AS Disease Activity Index (BASDAI)[15] and the Bath AS Functional Index (BASFI)[16]. Metrology measurements included chest expansion, Schober test, occiput to wall distance, finger to floor distance, and lumbar side flexion. Structural damage was assessed by the Bath AS Radiology Index (BASRI)[17], and spine-BASRI (s-BASRI) and total BASRI (t-BASRI) were calculated. HRQOL was assessed with the Spanish version of the AS Quality of Life scale (ASQOL; 0 = best HRQOL, 18 = worst HRQOL)[18].

Statistical analysis. Descriptive statistics were performed. To identify variables that distinguished between AS patients with and without work disability, a comparison between work-disabled versus not work-disabled patients was performed using chi-square tests for categorical variables and unpaired t tests for continuous variables. A multiple logistic regression model was built up to identify factors associated with work disability. Associations between work disability and independent variables were first examined in univariate logistic regression analyses. Variables that had a significant association with work disability were included in the regression models as independent variables. In these models, the dependent variable was work disability. A p value < 0.05 was considered significant.

RESULTS

In total, 699 patients with AS, 535 men (77%), with age 48.7 ± SD 12.7 years and disease duration 14.1 ± 10.1 years, were included in the analysis. Of them, 179 (25.6%) had a permanent work disability. The main characteristics of the whole AS population and the subgroups with and without work disability are shown in Tables 1 and 2. As shown in these tables, age, sex, patient global assessment, patient pain and night pain assessments, BASDAI, BASFI, t-BASRI, s-BASRI, chest expansion and other metrology measurements, and HRQOL measured by the ASQOL discriminated between AS patients who were work-disabled and those who were not. The same variables had a significant association with work disability in the univariate logistic regression analyses (data not shown).

In the multiple logistic regression model (pseudo R^2 = 0.26, p < 0.0001; Table 3) age, sex, disease duration, BASFI, t-BASRI, and chest expansion retained an independent association with work disability. When ASQOL was included in the model, it also retained an independent association with work disability (odds ratio 1.11, 95% CI 1.04–1.19, p = 0.001), but then the BASFI did not keep its association with work disability.

We also constructed a multiple logistic regression model excluding the BASFI score. In this model (pseudo R^2 = 0.25, p < 0.0001), age (OR 1.03, 95% CI 1.01–1.06, p < 0.0001), disease duration (OR 1.03, 95% CI 1.0–1.06, p = 0.006), t-BASRI (OR 1.4, 95% CI 1.2–1.7, p < 0.0001), chest expansion (OR 0.85, 95% CI 0.7–0.9, p = 0.019), and finger to floor distance (OR 1.01, 95% CI 1.00–1.03, p = 0.040) retained independent association with work disability.

DISCUSSION

In this cross-sectional study we assessed the frequency of work disability and the main variables related to it in a representative sample of Spanish patients with AS. We found that 25% of 699 patients with AS had permanent work disability. These findings are similar to previous reports, in which the prevalence of work disability ranges from 13% to 45%[2-4,7,11], and are similar to the prevalence of work disability in a Spanish population with rheumatoid disease[19]. The variability among the studies can be related to several factors, including the characteristics of the AS population and the methodology used in each study (self-reported disability, having a disability pension, working status, etc.).

As the primary outcome measure of our study, we chose the judgment of "permanent work disabled" and "received a work disability pension" by the Spanish Social Security System. It is possible this underestimates the true prevalence of disability because those patients who were in sick-leave status were not considered as work-disabled. Moreover, patients who did not receive a disability pension in spite of being disabled (i.e., housewives and people without paid employment) were not considered as work-disabled in this study. In contrast, those patients who received a pension by reason of "partial disability" were taken into account. However, we think that our primary endpoint is a reliable measure that increases the robustness of the analysis in identifying factors related to work disability.

We were able to identify several variables related to work disability, mainly patient's age, sex, disease duration, structural damage as measured by the BASRI, chest expansion, and physical functioning or HRQOL. Other studies have focused on identifying variables related to work disability in patients with AS[2,3,6,7,10]. Age, disease duration, physical functioning, and other work-related factors (i.e., physically demanding jobs) or coping styles have been related to work disability. Our study focused on demographic and disease-related variables without analyzing job-related factors as a cause of withdrawal from the labor force.

Age, sex, disease duration, and radiological damage were the AS-related variables found to be significantly associated with work disability in the multivariate analyses. Data concerning the age at which the work disability happened in each patient were not available. However, the association between age and work disability is well known and was consistent in our study.

Several metrology measurements (Schober test, chest expansion, occiput to wall distance, and finger to floor distance) were significantly related to work disability in the

Table 1. Characteristics of the total AS population and the subgroups with and without work disability (continuous variables).

Variable	Total AS Population, n = 699	AS Patients with Work Disability, n = 179	AS Patients without Work Disability, n = 520	p*
Age, yrs	48.7 ± 12.7	56.4 ± 10.0	46.1 ± 12.5	< 0.0001
Disease duration, yrs	14.1 ± 10.1	19.7 ± 9.7	12.1 ± 9.5	< 0.0001
Patient global assessment	4.8 ± 2.7	5.3 ± 2.7	4.6 ± 2.7	0.002
Patient pain assessment	4.2 ± 2.8	4.5 ± 2.8	4.2 ± 2.7	0.2
Patient night pain assessment	4.0 ± 3.0	4.5 ± 3.0	3.9 ± 3.0	0.01
Physician global assessment	3.2 ± 2.0	3.3 ± 2.0	3.1 ± 2.2	0.3
BASDAI	4.2 ± 2.4	4.7 ± 2.2	4.0 ± 2.4	0.0008
BASFI	3.8 ± 2.7	5.3 ± 2.4	3.3 ± 2.6	< 0.0001
t-BASRI	7.4 ± 4.2	10.2 ± 3.9	6.4 ± 3.8	< 0.0001
s-BASRI	6.4 + 4.4	8.6 ± 3.2	5.7 ± 3.1	< 0.0001
Chest expansion	3.5 ± 2.0	2.6 ± 1.8	3.9 ± 2.0	< 0.0001
Schober	2.9 ± 2.0	2.2 ± 2.2	3.2 ± 1.9	< 0.0001
Occiput to wall	4.9 ± 6.2	8.2 + 7.1	3.8 ± 5.4	< 0.0001
Finger to floor	19.6 ± 14.8	26.5 ± 13.0	17.2 ± 14.7	< 0.0001
Lumbar side flexion	21.4 ± 19.8	23.7 ± 24.0	20.6 ± 18.0	0.07
C-reactive protein	9.1 ± 14.3	8.6 ± 11.7	9.2 ± 15.0	0.6
ASQOL	7.2 ± 5.1	9.5 ± 4.8	6.4 ± 5.0	< 0.0001

* Unpaired t test. BASDAI: Bath AS Disease Activity Index; BASFI: Bath AS Functional Index; t-BASRI: total Bath AS Radiology Index; s-BASRI: spine Bath AS Radiology Index; ASQOL: Ankylosing Spondylitis Quality of Life scale.

Table 2. Characteristics of the total AS population and the subgroups with and without work disability (categorical variables).

Variable	Total AS Population, n = 699 (%)	AS Patients with Work Disability, n = 179 (%)	AS Patients without Work Disability, n = 520 (%)	p*
Sex				
Male	535 (77)	156 (87)	379 (73)	< 0.0001
Female	164 (23)	23 (13)	141 (27)	
HLA-B27				
Positive	527 (81)	133 (81)	394 (82)	0.7
Negative	121 (19)	32 (19)	89 (18)	
Exercise				
Yes	269 (38)	82 (46)	187 (36)	0.057
No	429 (62)	97 (54)	332 (64)	

* Chi-square test.

univariate analysis, but only chest expansion and finger to floor distance (in the model without BASFI) retained independent association with work disability in the multivariate analysis. Disease activity as measured by the BASDAI did not retain an association with work disability in the multivariate analysis.

When the ASQOL was included in the regression model, the association between work disability and BASFI did not remain, probably because physical functioning can be considered as a domain of HRQOL. Additionally, HRQOL should not be considered as a determinant of work disability because being work-disabled could probably contribute to the impairment of HRQOL. Thus, we chose the model without the ASQOL, in which the BASFI retained the association with work disability.

Because "physical functioning" and "work disability" can refer to similar domains we also performed the multivariate analysis without including the BASFI in the regression model. The results were similar, even though the independent association with patient's sex did not remain, and a significant association was found between work disability and finger to floor distance. The t-BASRI, Schober test, finger to floor distance, and occiput to wall distance had significantly worse values in men than in women (data not shown). We think this could explain the association between work disability and patient's sex in the model including the BASFI.

Table 3. Multiple logistic regression model with work disability as independent variable.

Independent variable	OR	95% CI	p
Age	1.04	1.01–1.06	0.001
Sex female	0.55	0.31–0.98	0.04
Disease duration	1.03	1.01–1.06	0.006
Patient global assessment	0.94	0.83–1.06	0.35
Patient night pain assessment	1.08	0.97–1.20	0.14
BASDAI	0.99	0.84–1.17	0.91
BASFI	1.18	1.04–1.32	0.007
t-BASRI	1.30	1.07–1.57	0.007
s-BASRI	0.83	0.65–1.05	0.12
Chest expansion	0.86	0.76–0.98	0.03
Schober	1.08	0.95–1.21	0.21
Finger to floor	1.01	0.99–1.03	0.48
Occiput to wall	1.00	0.96–1.04	0.76

BASDAI: Bath AS Disease Activity Index; BASFI: Bath AS Functional Index; t-BASRI: total Bath AS Radiology Index; s-BASRI: spine Bath AS Radiology Index.

Taken together, our findings suggest that disease duration, physical functioning, and structural damage are the disease-related determinants of work disability in patients with AS. Patient's sex is not likely to be an independent risk factor for work disability, and it is probable that work disability was more frequent in men than in women because men had more structural damage and worse metrology results than women.

From this perspective, the factors related to work disability should be modified in order to decrease the prevalence of work disability in patients with AS, but this must be confirmed in longitudinal studies. An early diagnosis of the disease and the ability of available therapies to prevent functional disability and structural damage should be key points in this strategy. Biologic agents have been proven to preserve the physical functioning of patients with AS, but there are many doubts about their ability to inhibit the radiographic progression. A recent study has shown a favorable effect of biologic therapy on ability to return to work in people with work disability due to AS[8]. In our study, only 52 patients (7.4%) were identified as receiving biologic therapy, and we were not able to find an association between treatment and work disability (data not shown).

The main limitation of our report is that we carried out a cross-sectional study, and so our findings should be considered with caution. Additionally, as discussed above, a unique outcome was considered (work disability according to the Spanish Social Security System criteria) and job-related and other factors such as coping styles were not analyzed. Specific information about the patient's job type (physical vs non-physical) was not collected. Other variables such as time to disability, patient's formal education, and previous treatments were not considered. These variables should be examined in future studies. The strength of the study is the large sample size, which yielded robust conclusions.

We observed a significant prevalence of work disability (25%) in Spanish patients with AS, and we were able to identify several variables related to it, mainly age, disease duration, structural damage measured by the BASRI index, and physical functioning or HRQOL. Longitudinal studies are needed to confirm these results.

REFERENCES

1. Ozgul A, Peker F, Taskaynatan MA, Tan AK, Dincer K, Kalyon TA. Effects of ankylosing spondylitis on health-related quality of life and different aspects of social life in young patients. Clin Rheumatol 2006;25:168-74.
2. Barlow JH, Wright CC, Williams B, Keat A. Work disability among people with ankylosing spondylitis. Arthritis Rheum 2001;45:424-9.
3. Boonen A, Chorus A, Miedema H, van der Heijde D, Landewé R, Shouten H, et al. Withdrawal from labour force due to work disability in patients with ankylosing spondylitis. Ann Rheum Dis 2001;60:1033-9.
4. Boonen A, Chorus A, Miedema H, van der Heijde D, van der Tempel H, van der Linden S. Employment, work disability, and work days lost in patients with ankylosing spondylitis: a cross-sectional study of Dutch patients. Ann Rheum Dis 2001;60:353-8.
5. Boonen A, van der Heijde D, Landewé R, Spoorenberg A, Shouten H, Rutten-van Molken M, et al. Work status and productivity costs due to ankylosing spondylitis: comparison of three European countries. Ann Rheum Dis 2002;61:429-37.
6. Chorus AM, Boonen A, Miedema HS, van der Linden S. Employment perspectives of patients with ankylosing spondylitis. Ann Rheum Dis 2002;61:693-9.
7. Forejtová S, Mann H, Stolfa J, Vedral K, Fenclová I, Nemethova D, et al. Factors influencing health status and disability of patients with ankylosing spondylitis in the Czech Republic. Clin Rheumatol 2008;27:1005-13.
8. Keat AC, Gaffney K, Gilbert AK, Harris C, Leeder J. Influence of biologic therapy on return to work in people with work disability due to ankylosing spondylitis. Rheumatology 2008;47:481-3.
9. Marengo MF, Schneeberger EE, Citera G, Cocco JA. Work status among patients with ankylosing spondylitis in Argentina. J Clin Rheumatol 2008;14:273-7.
10. Ward MM, Kuzis S. Risk factors for work disability in patients with ankylosing spondylitis. J Rheumatol 2001;28:315-21.

11. Ward RM, Reveille JD, Learch TJ, Davis JC Jr, Weisman MH. Impact of ankylosing spondylitis on work and family life: comparisons with US population. Arthritis Rheum 2008;59:497-503.
12. Collantes E, Zarco P, Muñoz E, Juanola X, Mulero J, Fernández Sueiro JL, et al. Disease pattern of spondyloarthropathies in Spain: description of the first national registry (REGISPONSER) extended report. Rheumatology 2007;46:1309-15.
13. Dougados M, van der Linden S, Juhlin R, Huitfeldt B, Amor B, Calin A, et al. The European Spondylarthropathy Study Group preliminary criteria for the classification of spondylarthropathy. Arthritis Rheum 1991;34:1218-27.
14. Van der Linden S, Valkenburg HA, Cats A. Evaluation of diagnosis criteria for ankylosing spondylitis: a proposal for modification of the New York criteria. Arthritis Rheum 1984;27:361-8.
15. Ariza-Ariza R, Hernández-Cruz B, Navarro-Sarabia F. La versión española del BASDAI es fiable y se correlaciona con la actividad de la enfermedad en pacientes con espondilitis anquilosante. Rev Esp Reumatol 2003;31:372-8.
16. Ariza-Ariza R, Hernandez-Cruz B, Navarro-Sarabia F. Physical function and health-related quality of life of Spanish patients with ankylosing spondylitis. Arthritis Rheum 2003;49:483-7.
17. Mackay K, Mack C, Brophy S, Calin A. The Bath Ankylosing Spondylitis Radiology Index (BASRI). A new validated approach to disease assessment. Arthritis Rheum 1998;41:2263-70.
18. Ariza-Ariza R, Hernández-Cruz B, López-Antequera G, Toyos FJ, Navarro-Sarabia F. Adaptación transcultural y validación de una versión en español de un instrumento específico para medir calidad de vida relacionada con la salud en pacientes con espondilitis anquilosante: el ASQoL. Reumatol Clin 2006;2:64-9.
19. Ruiz-Montesinos MD, Hernández-Cruz B, Ariza-Ariza R, Carmona L, Ballina J, Navarro-Sarabia F. Utilización de recursos en una cohorte de pacientes con artritis reumatoide atendidos en área especializada de reumatología en España. Reumatol Clin 2005;1:142-9.