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The toll of unemployment in axial spondyloarthritis: high prevalence and negative impact on outcomes captured in a national registry

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Objective: Axial spondyloarthritis (axSpA) is an inflammatory arthritis of the axial skeleton. Persistent disease activity can result in significant disability and affect the ability to maintain employment. This study aimed to determine the prevalence of unemployment in axSpA and the impact on patient outcomes.

Method: Data from the Ankylosing Spondylitis Registry of Ireland (ASRI) were cleaned, and information on employment, demographics, and disease characteristics was extracted. Patients were analysed on the basis of employment and categorized as employed or unemployed.

Results: Of the 759 participants included in the analysis, 23.5% (178) were unemployed, higher than national averages of 6.2–13.1% during the study period. Unemployed participants reported significantly worse Bath Ankylosing Spondylitis Disease Activity Index (BASDAI; 5.1 vs 3.6), Metrology Index (BASMI; 4.8 vs 3.4), Functional Index (BASFI; 5.2 vs 3.0), Health Assessment Questionnaire (HAQ; 0.82 vs 0.40), and Ankylosing Spondylitis Quality of Life (ASQoL; 9.4 vs 5.4) scores compared to employed (all $p < 0.01$). Male gender (odds ratio, 95% confidence interval: 2.65, 1.46–4.83), worse BASMI (1.16, 1.02–1.33), and worse HAQ scores (2.18, 1.13–4.19) were significantly associated with unemployment.

Conclusion: The prevalence of unemployment in axSpA patients is higher than in the general population, and is associated with worse quality of life, poorer levels of function, and higher levels of disease activity. Predictors of unemployment in axSpA were male gender, worse spinal mobility, and poorer level of function. Recognition of patients at risk of unemployment will improve opportunities for intervention and maintain participation in the workforce.

Axial spondyloarthritis (axSpA) is an inflammatory arthritis of the axial skeleton and sacroiliac joints (1). This term includes both radiographic axSpA, or ankylosing spondylitis (AS), and non-radiographic axSpA. Persistent disease activity can result in deformity of the spine, restriction of movement, and chronic pain (2). Onset is in the third and fourth decades of life (3), during which time many affected patients will be actively engaged in the workforce.

For many years, axSpA was associated with significant deformity and disability, issues which limited ability to maintain employment for many patients (4). With advances in treatments and diagnostics, it would be expected that unemployment levels now would be similar to those in the general population. The aim of this study was to examine the prevalence of unemployment

in axSpA and quantify the impact on burden of disease, level of function, and quality of life.

Method

Patient population

Data were captured via the Ankylosing Spondylitis Registry of Ireland (ASRI), a rich source of epidemiological data on axSpA in Ireland. This large national registry recruited patients from 12 rheumatology centres, representing all major geographic regions of the country.

All participants met the Assessment of SpondyloArthritis international Society (ASAS) classification criteria for axSpA, allowing data collection on both radiographic and non-radiographic axSpA. All participants were over the age of 18 years, with full capacity, and fluent in English. Written informed consent was obtained from all participants and ethical approval was received from local hospital ethics boards.

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Outcomes and assessments

Participation in the ASRI involved a single clinical visit with a trained investigator. A structured interview and medical records review captured information on demographics and patterns of disease. Self-administered questionnaires captured the following outcomes: the Bath Ankylosing Spondylitis Disease Activity Index (BASDAI), Bath Ankylosing Spondylitis Functional Index (BASFI), Health Assessment Questionnaire (HAQ), and Ankylosing Spondylitis Quality of Life (ASQoL) scores. A focused examination allowed calculation of the Bath Ankylosing Spondylitis Metrology (spinal mobility) Index (BASMI). Employment status was recorded at time of enrolment. Retirement or sick leave resulted in exclusion from the analysis.

Statistical analysis

IBM SPSS version 26 was used for statistical analysis. A series of comparison analyses was carried out to assess variation between employed and unemployed axSpA patients. Two-tailed t-tests tested for significance in differences between means of continuous variables, while a chi-squared test of independence was used for categorical variables. An alpha level of $p < 0.05$ was deemed significant. A binomial logistic regression model captured the effect of variables on the likelihood of unemployment.

Results

In total, 886 patients were enrolled in the ASRI, with 759 participants eligible for analysis. The population of the ASRI was made up of 73% ($n = 554$) males and 27% ($n = 205$) females, with 91% ($n = 690$) identifying as Caucasian. Mean \pm sd age was 43.4 ± 10.7 (range 18–73) years, mean disease duration 17.8 ± 10.9 years, and mean delay to diagnosis 7.6 ± 7.7 years. Mean scores were: BASDAI 4.00, BASMI 3.76, BASFI 3.46, HAQ 0.49, and ASQoL 6.33.

Females with axSpA had worse BASDAI (4.47 vs 3.80, $p < 0.01$), HAQ (0.56 vs 0.47, $p = 0.04$), and ASQoL (7.44 vs 5.95, $p < 0.01$) scores compared to males, although females recorded better BASMI scores (3.32 vs 3.92, $p < 0.01$).

The level of unemployment in the ASRI was 23.5% ($n = 178$), with 24% of patients ($n = 182$) reporting that their employment had been affected by axSpA, resulting in unemployment, disability, or part-time employment. Unemployed axSpA patients had significantly worse ASQoL [9.4 vs 5.4, 95% confidence interval (CI) 3.11–4.88, $p < 0.01$], HAQ (0.82 vs 0.40, 95% CI 0.34–0.50, $p < 0.01$), BASDAI (5.1 vs 3.6, 95% CI 1.1–1.88, $p < 0.01$), BASFI (5.2 vs 3.0, 95% CI 1.83–2.75, $p < 0.01$), and BASMI (4.8 vs 3.4, 95% CI 1.04–1.77, $p < 0.01$) scores (Figure 1) than employed participants.

Baseline demographics were similar in both cohorts, but unemployment was more prevalent in males with axSpA than in females (26.7% vs 14.6%, $p = 0.01$) (Table 1).

A binomial logistic regression was performed to determine the effects of gender, disease duration, and patient outcomes on the likelihood of unemployment in axSpA. The model was statistically significant [$\chi^2(8) = 109.75$, $p < 0.001$], correctly classifying 79% of cases overall. Of the nine variables, only three were statistically significant: gender, BASMI, and HAQ (Table 2). The area under the receiver operating characteristics (ROC) curve was 0.776 (95% CI 0.729–0.823), which shows an acceptable level of discrimination.

Discussion

This analysis demonstrates the high prevalence (23.5%) of unemployment in axSpA. National unemployment during the same period (2013–2019) was noticeably lower, with a range of 6.2–13.1% (5–7). Compared to other axSpA cohorts, the prevalence of unemployment in our cohort was above the reported prevalence in Spain of 20.1% (8), but lower than in Argentina, at 26.2% (9), and 30% in the UK (10). These results indicate that the higher unemployment level in axSpA is an issue extending beyond Ireland and affecting axSpA patients globally.

Overall, 24% of patients reported that their employment had been affected or limited by their disease. Similar results were found in an Italian axSpA cohort, with 21% reporting work restrictions due to axSpA (11). The loss or limitation of work productivity in such a large proportion of the cohort represents a significant financial loss for axSpA patients and their dependants. Lower socioeconomic status has previously been associated with worse health outcomes in axSpA, using the ASAS health index (12). This has also been associated with a higher prevalence of depressive symptoms and worse psychological well-being (13).

AxSpA patients who were unemployed were found to have significantly worse outcomes across all measures captured in this analysis compared to those who were employed. These included higher levels of disease activity, worse functional abilities, greater limitation of spinal mobility, and worse overall quality of life. This finding was supported by the results of the regression model, which found an increased likelihood of unemployment in patients with worse BASMI and HAQ scores. This could be explained by the higher prevalence of radiographic changes in unemployed patients (81.5% vs 76%, $p = 0.24$); however, this difference did not reach significance. There was a non-significant trend towards increased use of biological disease-modifying anti-rheumatic drugs (bDMARDs) in this group, possibly representing patients with persistent disease activity, hence the increased requirement for bDMARDs and worse outcome measures. Additional research capturing longitudinal data is required to determine whether

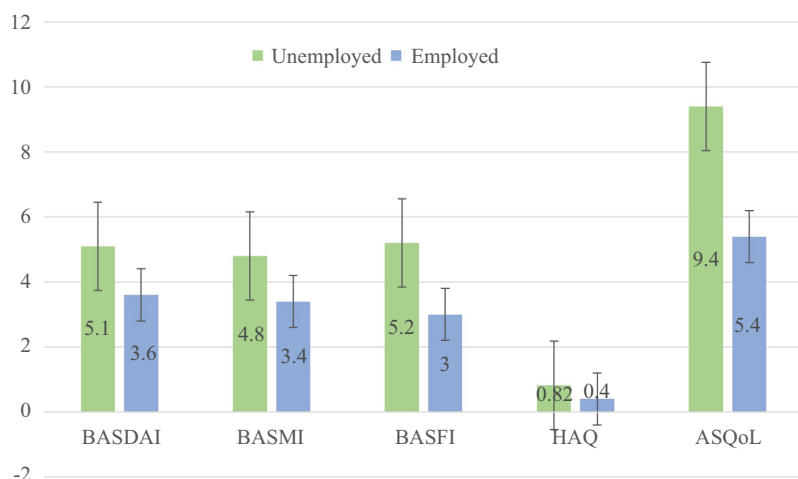


Figure 1. Comparison of mean outcomes on the basis of employment. BASDAI, Bath Ankylosing Spondylitis Disease Activity Index; BASMI, Bath Ankylosing Spondylitis Metrology Index; BASFI, Bath Ankylosing Spondylitis Functional Index; HAQ, Health Assessment Questionnaire; ASQoL, Ankylosing Spondylitis Quality of Life questionnaire. All differences were statistically significant at the $p < 0.01$ level.

Table 1. Characteristics of the employed versus unemployed cohort in the Ankylosing Spondylitis Registry of Ireland (ASRI).

	Unemployed	Employed	p
All patients	178 (23.5)	581 (76.5)	
Males	148 (83.1)	406 (70)	< 0.01
Females	30 (16.9)	175 (30.1)	
Age (years)	46.2 ± 10	42.5 ± 10.7	< 0.01
Disease duration (years)	19.6 ± 11.5	17.2 ± 10.7	0.02
Delay to diagnosis (years)	7.6 ± 7.6	7.6 ± 7.8	1
Age at symptom onset (years)	26.7 ± 9.6	25.2 ± 9.7	0.08
Caucasian	166 (93.3)	524 (91.2)	0.25
HLA-B27 ⁺	121 of 134 (90.3)	414 of 457 (90.1)	0.92
Radiographic sacroiliitis	145 (81.5)	441 (76)	0.24
MRI sacroiliitis	68 (38.2)	280 (48.2)	0.06
Arthritis	56 (31.5)	163 (28.1)	0.68
Enthesitis	36 (20.2)	92 (15.8)	0.38
Dactylitis	13 (7.3)	35 (6)	0.67
Psoriasis	31 (17.4)	96 (16.5)	0.78
Uveitis	62 (34.8)	198 (34.1)	0.53
Colitis	11 (6)	59 (10.2)	0.21
NSAIDs	88 (49.4)	301 (51.8)	0.59
csDMARDs	45 (25.2)	128 (22)	0.39
bDMARDs	133 (74.7)	392 (67.5)	0.14
CRP (mg/L)	7.4 (11.2)	6.9 (13)	0.62
ESR (mm/h)	17.2 (18)	14.8 (17)	0.24

Data are shown as n (%), mean ± SD

HLA-B27, human leucocyte antigen B27; MRI, magnetic resonance imaging; NSAID, non-steroidal anti-inflammatory drug; csDMARD, conventional synthetic disease-modifying anti-rheumatic drug; bDMARD, biological disease-modifying anti-rheumatic drug; CRP, C-reactive protein; ESR, erythrocyte sedimentation rate.

a causal relationship between disease activity and employment exists.

Male gender, limitation of spinal mobility, and worsening HAQ scores were all significantly associated with an

Table 2. Regression model for factors associated with unemployment in axial spondyloarthritis.

	OR	95% CI	p
Male gender	2.65	1.46–4.83	< 0.01
Age	1.01	0.98–1.03	0.62
Delay to diagnosis	0.99	0.96–1.02	0.46
Disease duration	1.00	0.98–1.03	0.75
BASDAI	1.04	0.90–1.20	0.62
BASMI	1.19	1.02–1.33	0.02
BASFI	1.03	0.93–1.13	0.61
HAQ	2.18	1.13–4.19	0.02
ASQoL	1.07	1.00–1.14	0.05

BASDAI, Bath Ankylosing Spondylitis Disease Activity Index; BASMI, Bath Ankylosing Spondylitis Metrology Index; BASFI, Bath Ankylosing Spondylitis Functional Index; HAQ, Health Assessment Questionnaire; ASQoL, Ankylosing Spondylitis Quality of Life questionnaire; OR, odds ratio; CI, confidence interval.

increased likelihood of unemployment. As males with axSpA have significantly worse average BASMI scores than females, this could explain the higher levels of unemployment observed in males with axSpA. Both BASMI and HAQ scores are routinely recorded in axSpA patients. Monitoring for worsening trends could help to identify patients at risk of employment loss and trigger prompt intervention from a multidisciplinary team.

Limitation of work productivity is often a precursor to job loss and unemployment. This concept, while difficult to quantify and monitor, can significantly affect a patient's overall well-being and is important to capture. Tools are being developed to identify axSpA patients at risk of impaired productivity; these aim to improve recognition of at-risk individuals and allow intervention (14). The Work Productivity and Activity Impairment questionnaire in AS (WPAI:SpA) was developed specifically for axSpA patients to capture both employment and productivity (15).

The simplicity of this self-administered questionnaire allows for regular monitoring as part of routine care for axSpA patients. Regular use of such a tool would give valuable insights into participation in the workforce and the impact of disease on functional ability.

The strengths of this study were the large size of the patient population and the detailed characterization to support the analysis. Cohorts were adequately powered to detect differences, without individual results disproportionately skewing overall proportions. Data were collected by trained investigators, ensuring reliability of collection. Data were gathered from multiple centres, allowing accurate representation of the true axSpA patient population of Ireland. The inclusion of a regression model identified risk factors for unemployment, which has significant clinical implications.

The main limitation of this study is the cross-sectional nature of the data from the ASRI, preventing the ability to detect causal relationships. Data were collected over 8 years, during which time national unemployment rates fluctuated but remained significantly lower than the unemployment rates observed from patients in the ASRI. Lack of data on occupation type prevented analysis of the association between employment status and specific occupations. Data on education were not available; however, education in Ireland is state funded, with an average age of 19.9 years at the time of completion of education (16). As Ireland does not have centralized medical records, it is difficult to report the percentage of axSpA patients in Ireland captured within the ASRI. However, patients were recruited from all major geographic regions of Ireland and across the socioeconomic spectrum to reflect the true population as accurately as possible.

Conclusion

The prevalence of unemployment in axSpA remains notably higher than nationally reported averages from the general population. Despite a high uptake of bDMARD use, these patients have higher levels of disease activity, poorer levels of function, and worse quality of life than employed axSpA patients. A large proportion of axSpA patients reported work limitations due to their disease. Factors associated with unemployment were male gender, worse spinal mobility, and greater functional impairment. In males, higher BASMI scores were a significant contributory factor to the higher rates of unemployment observed. Prompt intervention would provide an opportunity for occupational support and prevent progression to unemployment. The increased use of tools to identify at-risk patients will allow for rapid recognition and intervention to allow these patients to remain active members of the workforce.

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Disclosure statement

No potential conflict of interest was reported by the authors.

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