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Factors influencing work disability in psoriatic arthritis; first results from a large UK  
multicentre study

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## Objectives

The aim of this study was to determine the extent to which structural damage, clinical disease activity, demographic and social factors are associated with work disability (WD) in psoriatic arthritis (PsA).

## Methods

Four hundred patients fulfilling CASPAR criteria for PsA were recruited from 23 hospitals across the UK. Demographic, socioeconomic, work, clinical and radiographic data were collected. WD was assessed with the WPAI-SHP reporting work disability as percentage of absenteeism (work time missed), presenteeism (impairment at work/reduced effectiveness) and work productivity loss (overall work impairment/absenteeism plus presenteeism). Logistic and linear regressions were conducted to investigate associations with WD

## Results

Two hundred and thirty six participants of any age were in work. Absenteeism, presenteeism and productivity loss rates were 14% (SD 29.0), 39% (SD 27.2) and 46% (SD 30.4) respectively. Ninety two (26%) participants of working age were unemployed. Greater age, disease duration of 2 to 5 years and worse physical function were associated with unemployment. Patient reported employer awareness and helpfulness exerted a strongly positive influence on remaining in employment. Higher levels of global and joint specific disease activity and worse physical function were associated with greater levels of presenteeism and productivity loss amongst those who remained in work.

## Conclusion

Reduced effectiveness at work was associated with measures of disease activity whereas unemployment, considered the endpoint of work disability, was associated with employer factors, age and disease duration. Longitudinal study is underway to determine whether treatment to reduce disease activity ameliorates work disability in the real world setting.

## Introduction

Psoriatic Arthritis (PsA) is a chronic inflammatory arthritis associated with psoriasis. Patients with PsA may have skin and joint disease but may also have manifestations such as enthesitis, axial disease, uveitis, the metabolic syndrome and other less well defined factors related to long term inflammation such as fatigue. All these elements combine to have a significantly detrimental effect on physical function and quality of life.<sup>1</sup> Work is of central importance to patients and it is now well recognised that work disability (WD) is an important, patient centred quality of life outcome that needs further investigation.<sup>2</sup> WD is an umbrella term encompassing a spectrum of disability including productivity loss, presenteeism (reduced effectiveness at work), through to absenteeism and unemployment.

The existing body of knowledge relating to WD in PsA has been recently reviewed.<sup>3</sup> There is evidence suggesting that levels of unemployment (20-50%) and WD (16-39%) are high and associated with longer disease duration, worse physical function, high joint count, low educational level, female sex, erosive disease and manual work. Interpretation of this data is hampered by the small number of reports, heterogeneity of data collected and the limitations of post hoc analyses of work data as a secondary endpoint.<sup>3</sup> The current body of evidence comes either from short duration, highly selected randomised controlled trials (RCT's) with limited generalizability or registry databases relating to employment levels or disability benefit collection.

We set out to determine to what extent structural damage, clinical disease activity, demographic and social factors are associated with employment, absenteeism, presenteeism, and productivity loss in psoriatic arthritis using the work productivity and activity impairment measure (WPAI).<sup>4</sup>

## Methods

Long Term Outcome in Psoriatic arthritis II (LOPAS II) is a multicentre observational cohort study conceived to explore the associations with WD in PsA and study the effect of drug treatment. Twenty three sites across England participated in this study. Four hundred patients fulfilling CASPAR criteria for PsA commencing a new DMARD or anti-TNF treatment were recruited and baseline data have been used to investigate factors associated with WD.

Demographic information on sex, education, smoking and alcohol use, ethnicity, disease and symptom duration and number and type of co-morbidities was collected using a background information form. The following outcome data was collected at the routine clinic visits: physician assessment of disease activity was made with the disease activity in psoriatic arthritis composite score DAPSA (summation of 66 swollen and 68 tender joint count, C-reactive protein (CRP), patient global and pain visual analogue scores (VAS) summed together)<sup>5</sup>, patient reported outcomes included physical function with the health assessment questionnaire (HAQ), the European quality of life five domain questionnaire (EQ5D), dermatology quality of life index (DLQI), global and domain specific activity VAS scores and the functional assessment of chronic illness therapy (FACIT fatigue). Work disability was assessed with the WPAI, a patient-reported quantitative assessment of the amount of absenteeism, presenteeism, productivity loss and general activity impairment attributable to a specific health problem. Additional work data was collected on a questionnaire designed for this study including job title (converted into the international standard classification of occupational 2008 (ISCO-08), employer awareness/helpfulness on a Likert scale. Radiographs of the hands and feet were taken and scored using the psoriatic arthritis Ratingen score.<sup>6</sup>

### *Statistical analysis*

Statistical analysis of demographic data has been undertaken in SPSS v20. Associations between potential explanatory variables and unemployment status were examined using multivariate logistic regression and with per cent presenteeism and productivity loss using multivariate linear regression models. The distribution of absenteeism showed small numbers in a number of categories and was converted into a binary variable representing either present (0%) or absent (100%) and analysed using multivariate logistic regression. The regression analyses were undertaken using the statistical package R (2011). All measured variables were considered for inclusion, including location. Age demonstrated a non-linear relationship therefore a quadratic term was applied. Two way interactions were considered in all models but no significant effects at this level were observed.

## Results

Of the four hundred participants three hundred and eighteen were of UK working age (18-65 years), mean age 46.8 years (sd 11.02), mean disease duration 5.8 years (sd 8.00), 49.9% female. Two hundred and twenty six participants of working age participants (64%) were in work with a further ten over retirement age still working. Ninety two participants of working age (26%) were unemployed. Comparison of demographic, clinical, radiographic and socioeconomic factors of those working (any age) and those not working (18 -65 years only) are presented in table 1. The mean level of absenteeism, presenteeism and productivity loss of the 236 participants in work was 14% (sd 29.0), 39% (sd 27.2) and 46% (sd 30.4) respectively.

Negative influences upon remaining in employment included greater age, duration of two to five years and worse physical function (Table 2). For every additional year of age the risk of unemployment increased by 1%, Odds Ratio (OR) of 0.99 (95% CI 0.994 to 0.999,  $p=0.02$ ). Disease duration of 2 to 5 years exerted a strongly negative influence upon remaining in employment OR 0.41 (95% CI 0.180-0.953  $p=0.03$ ). The association of worse physical function with unemployment was strong such that the risk of unemployment increased by OR 0.56 (0.343 – 0.926,  $p=0.02$ ) for every increase in HAQ score by 1 (HAQ score 0-3). Finally employer helpfulness exerted a strongly positive influence on remaining in employment. If participants rated an employer as helpful the likelihood of employment was increased by an OR of 15.10 (95% CI 4.658-69.355,  $p<0.01$ ). This positive effect was sustained even if the participant perceived that no help was required, OR 3.22 (95% CI 1.264-8.229,  $p<0.01$ ).

Absenteeism as a binary variable (present or absent over the prior week) was associated with worse joint activity visual activity scale (0-100) such that for every increase of 10 on the VAS scale the OR of absenteeism increased by 4% (OR 1.04 (95% CI 1.018-1.055,  $p<0.01$ ).

Greater global, joint specific disease activity and worse physical function exerted a negative influence on presenteeism and productivity loss (Table 2). For every increase in global disease activity visual analogue scale (0-100) of 10 there was an increase of presenteeism of 2% (estimate 0.02, 95% CI 0.001-0.053,  $p=0.01$ ) and 3%

for productivity loss (estimate 0.03, 95% CO 0.003-0.55, p=0.01). Worse physical function (HAQ scale 0-3) was strongly associated with more presenteeism and productivity loss. For every increase in HAQ of 1 presenteeism was 47% higher (estimate 0.63, 95% CI 0.005-1.200, p=0.03) and productivity loss 12% higher (estimate 0.12, 95% CO 0.066-0.182, p<0.01).

## Discussion

We report the associations of unemployment, absenteeism, presenteeism and productivity loss amongst a well classified cohort of patients with PsA recruited from multiple sites across England.

With regards to unemployment we report the novel findings that patient reported employer helpfulness, greater age and recent disease onset are associated with unemployment. The British Society of Rheumatologists Biologics Register (BSRBR) is the only study to date to investigate the influence of age upon employment and did not find an association.<sup>7</sup> In this present study the absolute effect of each year of age upon becoming unemployed is small, an increase of 1% for every additional year of age. PsA is however a chronic disease and when considered over decades this effect becomes a clinically meaningful burden.

The finding in our present study of increased unemployment in those with early disease (two to five years duration) is an interesting one and in keeping with the finding of high levels of unemployment in the first five years of rheumatoid arthritis reviewed by Nikiphorou *et al.*<sup>8</sup> Four studies have previously reported that increasing disease duration negatively influences remaining in employment.<sup>7, 9-11</sup> The findings of this present study of increased unemployment in those with disease duration of 2-5 years does differ from these prior reports and the differences in study designs may account for this. First, the mean disease duration of patients in this study was 8 years, substantially less than the one other study conducted in the UK, the BSRBR study (14years)<sup>7</sup>. Second, differing social security systems may influence an individual's decision to stop work and three of the other prior studies were conducted in countries other than the UK; Germany<sup>10</sup> Norway<sup>11</sup> and Sweden<sup>9</sup>. Finally we have measured relatively short duration absenteeism with the WPAI which has a recall period of one

week whereas other studies were based on government social security benefit collection records thus measuring more long-term absence from work.

To our knowledge this is the first time patient reported employer helpfulness has been investigated in PsA. We have found that and employer awareness and helpfulness on remaining in employment exerts a positive influence, even if patients perceive no help is required. This finding emphasises the multifactorial influences upon WD and the importance of accounting for as many potentially confounding factors as possible. The strength of this association in the regression model may account for variables identified in previous studies such as worse physical function<sup>7, 11, 12</sup>, joint disease<sup>7, 12, 13</sup>, fatigue<sup>12</sup>, erosive disease<sup>11</sup>, sex<sup>7, 9, 11</sup> and education<sup>10, 11</sup> not achieving significant associations and subsequent inclusion into the final models.

Relating to absenteeism, presenteeism and productivity loss amongst those at work we report that only disease activity factors rather than demographic or socioeconomic factors influence performance. Specifically in this present study greater global, joint specific disease activity and worse physical function exerted a negative influence on presenteeism and productivity loss. Furthermore disease activity measures appear to exert a greater influence than severity (radiographic damage), which did not achieve inclusion into the final models. This suggests that although there are multiple potential social and economic influencing factors disease activity remains an important influencing factor.

The finding that global and joint specific activity but not the domain of skin disease (skin specific activity VAS score or DLQI) reached statistical significance in the final models is consistent with prior reports comparing patients with PsA and those with psoriasis alone. Two studies have reported increased WD amongst patients with PsA versus patients with psoriasis alone.<sup>14, 15</sup> To our knowledge this is the first study reporting the relative impact of joint and skin disease on WD and indicates that joint disease exerts the greatest influence in this cohort. It should be noted that the level of skin activity compared to joint activity was low (39% skin VAS versus 62% joint VAS amongst those not working). By including people with relatively mild skin disease we may have overestimated the relative influence of the joint domain. Nonetheless the finding in this study that disease activity measures, which are



potentially reversible, exert a negative influence upon performance at work adds strength to the theory that presenteeism/ productivity loss can be improved with treatment.

The findings of this study should be interpreted in light of certain methodological considerations. First, the twenty three recruiting centres were located across England though did not include London, potentially limiting the generalisability of the results. We did employ a spatial model to assess for geographic variation in WPAI however and no differences were detected. Second, we have previously reported low levels of agreement between joint count assessors in this study which will have reduced our ability to detect any association with WD.<sup>16</sup> Training in joint count assessment was subsequently given to recruiting centres in an attempt to standardise clinical assessment. Finally it should be noted that the employer helpfulness Likert scale was developed for use in this study and has not been formally validated.

In conclusion greater age, recent disease onset (2 to 5 years disease duration) and worse physical function exert a negative influence on remaining in employment. Patient reported employer awareness and helpfulness exerts a strongly positive influence on remaining in employment, even if patients perceive no help is required. In contrast in those who remain at work reduced effectiveness (presenteeism and productivity loss) are associated with the disease activity measures of greater global, joint specific visual analogue scales and worse physical function. Further prospective study is underway to investigate whether ameliorating disease activity improves absenteeism, presenteeism and productivity loss.

**Key points:**

- Presenteeism and productivity loss are associated with measures of greater disease activity.
- Unemployment is associated with employer helpfulness, age, disease duration and physical function.

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**Disclosure:**

The authors declare no conflicts of interest

**Ethical Approval:**

LOPAS II was approved by the South Wales Research Ethics Committee Panel D. All participants signed written consent in accordance with the declaration of Helsinki.

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