

## CONCISE REPORT

# Depression is a stronger predictor of the risk to consider work disability in early arthritis than disease activity or response to therapy

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## ABSTRACT

**Objectives:** To evaluate the factors that influence patients with early inflammatory arthritis to consider a disability pension.

**Methods:** A total of 528 patients aged 63 or younger from an early arthritis cohort with a mean symptom duration of 3 months at inclusion were asked at 12 and 24 months whether they were considering applying for, had applied for or were receiving a disability pension because of arthritis. Possible predictors were analysed with univariate and multivariate logistic regression.

**Results:** 69 patients (13%) were considering, had applied for or were receiving a disability pension. Univariate predictors were older age, disease activity, several patient-reported outcomes and depression. In a multivariate analysis, age, days on sick leave, impairment of physical function and depression were predictive for considering a disability pension (OR for severe vs no depression: 3.85, 95% CI 1.43 to 10.4).

**Conclusions:** In patients with early arthritis, depression appears to be a stronger predictor of the risk to consider applying for work disability pension than the features of disease activity. Patients at risk could be identified with one single depression statement. This finding should prompt physicians to react early to signs and symptoms of depression to help patients to maintain their ability to work.

## INTRODUCTION

Gainful employment is an important component of quality of life and social participation. Patients with rheumatoid arthritis (RA) are at an increased risk of work disability from the onset of their symptoms.<sup>1</sup> The data from early arthritis cohorts report 10–30% early retirement rates during the first years of RA.<sup>2,3</sup> The multinational QUEST-RA study found that 20% of the patients were work disabled at 2 years.<sup>1</sup> In German patients with RA, early retirement rates declined during the past decade.<sup>4</sup> However, with ongoing disease duration, loss of employment resulting from RA

## Key messages

- This is the first study investigating predictors of disability pension in a German early arthritis cohort.
- Depression was found to be the strongest predictor of disability pension.
- It was possible to identify patients at risk with a single depression statement. This could help to identify those patients in need of more attention on their depressive symptoms and help them to stay in the workforce.

has increased from 5% within the first 2 years to 30% within the first 10 years after the onset of RA.<sup>4</sup> Work disability is a major proportion of the costs of RA.<sup>5</sup> Disease activity and severity, functional disability and morning stiffness have been reported to increase work disability in patients with arthritis.<sup>6–9</sup> The patient-related risk factors include older age, female sex, comorbid conditions, lower education and having a physically demanding job.<sup>7,10,11</sup> Wallenius *et al*<sup>10</sup> reported that worse mental health is associated independently with work disability. In the Early RA Network (ERAN) inception cohort, pain and low vitality predicted work disability.<sup>2</sup>

Taking the evidence for a complex interaction between a patient's physical and mental well-being and the risk of early retirement into account, in a patient with early arthritis cohort, we aimed to determine the potentially modifiable factors that influence a patient's consideration or decision to apply for a disability pension.

## METHODS

The Course And Prognosis of Early Arthritis (CAPEA) inception cohort is a prospective,

multicentre, non-interventional, observational study investigating the prognostic value of early symptoms for the development of a chronic course of disease in patients who have had arthritis for less than 6 months. Between 2010 and 2013, 1301 patients were consecutively enrolled in 118 outpatient rheumatology clinics and practices in Germany.

Of 1301 study participants, 528 patients, aged 63 or younger, who were available for the labour market (gainfully employed, on sick leave or unemployed), were eligible for the analysis. The patients were observed for 2 years and asked at 12 and 24 months whether they had considered applying for, had already applied for or were receiving a disability pension. Patients were considered to be at risk to apply for disability pension if they answered the question positively at 12 and/or 24 months. They were not considered to be at risk if they reported not to consider applying for disability pension any more at 24 months.

To identify the patients at risk, the following parameters were documented by the physician: age, sex, body mass index, components of the disease activity score (DAS) 28, and 14 chronic comorbid conditions (yes/no). The patient reported on the educational level, job requirements, sick leave taken during the last 6 months, physical workload (low/moderate/high/very high), pain and morning stiffness (numerical rating scales, NRS 0–10), the first five questions of the Profile of Fatigue and Discomfort (PROFAD),<sup>12</sup> the Rheumatoid Arthritis Impact of Disease Score (RAID, 0–10)<sup>13</sup> and functional capacity by the percentage of full function according to the Hannover Functional Status Questionnaire (FFbH 0–100).<sup>14</sup> Depression was measured by the Patient Health Questionnaire Depression Score (PHQ-9),<sup>15</sup> which comprises nine mood statements such as ‘Little pleasure or interest in doing things’ over the previous 2 weeks (not at all/on several days/on more than half of the days).

In univariate logistic regression models, the parameters that predict considering applying for or receiving a disability pension were identified. The variables that were predictive in the univariate models were then considered for the multivariate logistic regression model. We identified the models with the highest likelihood score statistics and four covariates.

## RESULTS

### Patient descriptions

At baseline, 624 patients in the early arthritis cohort were 63 years of age or younger. A total of 528 of these patients (85%) were employed or seeking a job at the time of RA onset (table 1). Sixty-six per cent of the patients were actively working, 14% were on sick leave, 5% were unemployed, 6% were homemakers and 7% were retired or receiving a disability pension, 1% were in education and for 1% the employment status was missing. At 2 years after the onset of RA, 42 employed

patients (8.0%) reported that they were considering applying for, 18 (3.4%) had applied for and 9 (1.7%) had obtained, a work disability pension.

At baseline, these 69 patients were an average of 5 years older than those who had not considered retiring early, and had significantly higher mean values of disease activity, disease severity and fatigue (table 1).

In the univariate logistic regression analysis, age, the days of sick leave taken, the baseline DAS28, FFbH and PROFAD values and the PHQ-9 sum score as well as item 1 of the PHQ-9 predicted the disability pension considerations (table 2).

Twelve per cent of the patients reported moderate to severe depression according to the PHQ-9. A considerable association was found between work disability and the first PHQ-9 item, ‘Little pleasure or interest in doing things’; 10% of the patients reported this item for at least one-half of the days during the previous 2 weeks. Of these patients, approximately one-third reported having a work disability, which was reported in 5% of the patients without mood problems.

In the multivariate logistic regression analysis, age, the PHQ-9, the days of sick leave taken during the previous 6 months and impaired physical function (FFbH <70) were identified as the most important predictors of considering applying for a disability pension (figure 1). Fatigue was a strong predictor for considering a disability pension; however, we omitted it from the model because of its collinearity with physical functioning. If the first item of the PHQ-9 was included instead of the full questionnaire, the answers ‘more than half of the days’ or ‘nearly every day’ during the past 2 weeks were strongly predictive (figure 1). None of the arthritis activity measures or the comorbidities we considered were significantly associated with considering early retirement. Additionally, the employment status at baseline (working, on sick leave, unemployed) did not increase the risk of considering early retirement.

## DISCUSSION

Previous studies indicated that, in addition to age and disease activity, patient well-being contributes to the incidence of patients with RA having a disability pension.<sup>2 10 16</sup> In our cohort, 13% of the employed patients with early arthritis were considering, were applying for or were receiving a disability pension within 2 years of the onset of arthritis. In Germany, patients receive sickness benefit from their health insurance for up to 18 months. This is why it is rather unusual to newly receive a disability pension within the first 24 months after the onset of arthritis. Therefore, it is all the more important to identify the patients who consider applying for a disability pension already at a very early stage of the disease. This proportion is in agreement with the reported disability pension rates from the National Database of the German Collaborative Arthritis Centers and with other European early arthritis

**Table 1** Baseline characteristics

	Patients employed or on the job market (n=528)	Patients considering or receiving a disability pension (n=69)
Age (years), mean (SD)	47 (9.5)	52.3 (6.2)
Female (%)	68	59
Symptom duration (weeks), mean (SD)	12.8 (7.6)	12.4 (6.6)
RF and/or ACPA positive (%)	57	61
ACR/EULAR criteria positive (%)	58	71
DMARDs (%)	88	95
Sick leave during the last 6 months (days), mean (SD)	14 (25)	38 (51)
BMI, mean (SD)	26.6 (4.8)	27.6 (5.1)
DAS28 ESR, mean (SD)	4.4 (1.4)	5.1 (1.3)
ESR (mm/h), mean (SD)	25 (19.8)	38.5 (25.3)
CRP (mg/L), mean (SD)	13.6 (27.8)	27.8 (46.2)
Number of comorbidities, mean (SD)	0.6 (0.9)	0.9 (1.3)
Pain (NRS 0–10), mean (SD)	5.3 (2.6)	6.2 (2.5)
Fatigue (PROFAD, 0–50), mean (SD)	14.9 (12.3)	24 (13)
Morning stiffness (NRS 0–10), mean (SD)	5.1 (3.2)	6.2 (3)
SJC28, mean (SD)	5.4 (5.1)	6.6 (6.8)
TJC28, mean (SD)	8.9 (6.1)	10.3 (6.8)
Functional capacity (FFbH, 0–100), mean (SD)	81.8 (17.4)	69 (19.1)
Unemployed patients (%)	6	18
Patients on sick leave (%)	17	31
Physical job demands (%)		
Low	30	16
Moderate	31	38
Severe	39	46
Education level (%)		
Low	27	40
Moderate	51	37
High	22	23
Depression (PHQ-9) (%)		
No	60	36
Low	25	20
Moderate	10	22
Severe	5	22

The 69 patients who have considered a disability pension, applied for one or newly received one are a subgroup of the 528 patients who are employed or on the job market.

ACPA, anticitrullinated protein antibody; BMI, body mass index; CRP, C reactive protein; DAS28, disease activity score; DMARDs, disease-modifying antirheumatic drugs; ESR, erythrocyte sedimentation rate; FFbH, Hannover Functional Status Questionnaire; NRS, numerical rating scales; PHQ-9, Patient Health Questionnaire Depression Score; PROFAD, Profile of Fatigue and Discomfort; RF, rheumatoid factor.

cohorts.<sup>2–4</sup> Our data showed that features of depression were stronger predictors of considering retiring early than were disease activity, physical job demands or somatic comorbidity. For example, in the univariate logistic regression models, the OR for a two-point difference in DAS28 was 2.6, lower than the OR of 4.9 of moderate to severe depression versus no depression. Also, the multivariate analysis with depression had a better likelihood score than models including disease activity. One single depression statement was able to identify patients at an increased risk. A recent report from the Swedish Rheumatology Quality register showed that work ability at the onset of RA was the most important predictor of sick leave and disability pension within the first 3 years.<sup>3</sup> We included the work status at baseline in the multivariate analysis, and it did not emerge as an

independent predictor for a patient considering applying for a disability pension. We omitted fatigue from the analysis due to its collinearity with physical functioning. There is also evidence for the association between fatigue and physical function in the literature.<sup>17</sup>

There are limitations of our study. First, the signs of depression were recorded by the patients and were not confirmed by a physician. Patient questionnaires should be interpreted with caution due to the overlap of symptoms arising from RA and depression.<sup>18</sup> But independent of the origin, attention should be paid to these patients in order to maintain their work ability. Second, we only examined the patient's consideration to request a disability pension. Early retirement as a single outcome would require a longer follow-up. For many patients, work ability is an important concern soon after

**Table 2** Baseline predictors of early retirement within the first 2 years of rheumatological care: results from univariate logistic regression models

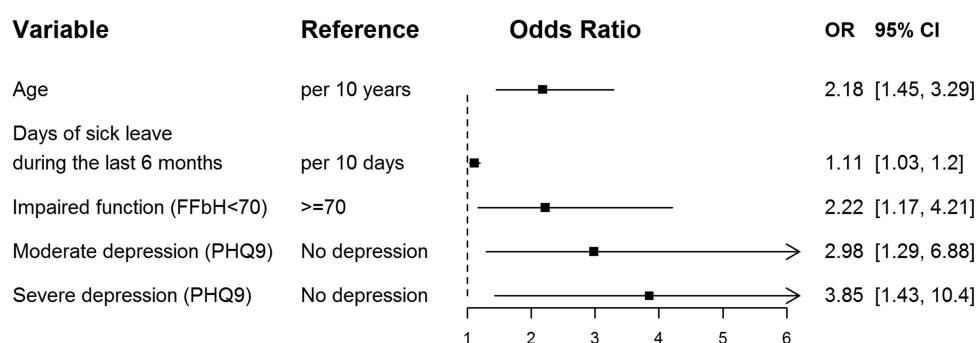
	Reference	OR	95% CI	p Value
Female	Male	0.70	0.42 to 1.17	0.18
Age	Per year	1.08	1.05 to 1.12	<0.001
Low educational level	High educational level	1.5	0.75 to 3.02	0.24
Heavy physical job demands	Low demands	2.22	0.85 to 5.83	0.10
Sick leave 6 months prior to baseline	Per 10 days	1.19	1.11 to 1.27	<0.001
BMI	Per unit	1.04	0.99 to 1.10	0.10
Comorbid conditions	Per condition	1.33	1.05 to 1.69	0.02
DAS28	Per unit	1.61	1.31 to 1.97	<0.001
Pain (0–10)	Per unit	1.14	1.03 to 1.26	0.009
Fatigue (PROFAD, 0–50)	Per 10% increase	1.31	1.19 to 1.45	<0.001
Morning stiffness (NRS 0–10)	Per unit	1.13	1.04 to 1.23	0.004
Functional capacity (FFbH, 0–100)	Per 10% worsening	1.42	1.25 to 1.61	<0.001
Moderate to severe depression (PHQ-9)	No depression	4.87	2.69 to 8.84	<0.001
Depression most days (PHQ-9-Item 1)	Not depressive	8.09	3.40 to 19.25	<0.001
EULAR response at 12 months (no response)	Good response	1.7	0.79 to 3.89	0.17

BMI, body mass index; DAS28, disease activity score; FFbH, Hannover Functional Status Questionnaire; NRS, numerical rating scales; PHQ-9, Patient Health Questionnaire Depression Score; PROFAD, Profile of Fatigue and Discomfort.

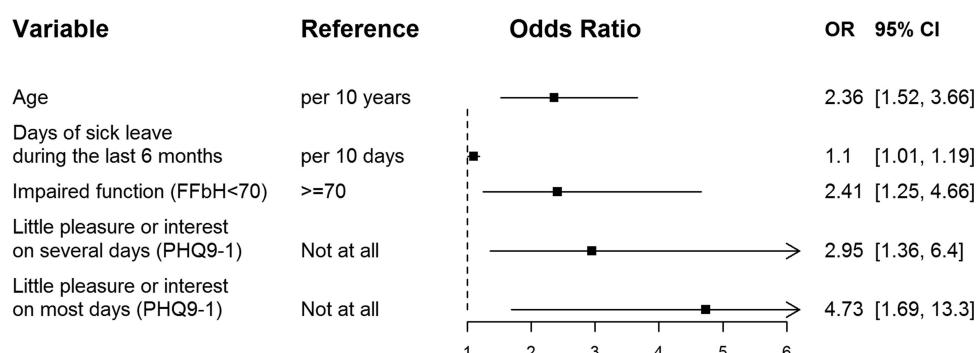
disease onset. It is very likely that early intervention in patients at risk for work disability would have the highest probability of success.

The strength of our data is that we provide information on the stages of the decision-making process of the patients. There is a strong association between the

### Model with PHQ9 Score



### Model with only Question 1 of the PHQ9 Score



**Figure 1** Results from multivariate logistic regression models. The first model includes the full PHQ-9 score as a predictor, the second model includes only question 1 of the PHQ-9 (PHQ-9, Patient Health Questionnaire Depression Score; FFbH, Hannover Functional Status Questionnaire).

indicators of depression and the risk of considering early retirement in our data, and we suggest assessing the effect of depressive disorders on work disability in patients with arthritis in future studies. Careful attention to the emotional well-being of patients in the early stages of RA is important for helping individuals remain in the labour force.

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**Contributors** All authors were involved in drafting the article or revising it critically for important intellectual content, and approved the final version to be published. JC had full access to all of the data in the study, and takes responsibility for the integrity of the data and the accuracy of the data analysis. GW, AZ and GS were involved in study conception and design. GW and JC were responsible for acquisition of the data. KA, JC, GS and AZ were involved in analysis and interpretation of the data.

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