

The impact of rheumatoid arthritis on employment status in the early years of disease: a UK community-based study

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Abstract

Objective. To establish the prevalence of work disability and predictors of change in employment status in patients with early rheumatoid arthritis (RA).

Setting. The Norfolk Arthritis Register (NOAR), a primary-care based inception cohort of patients with recent-onset inflammatory arthritis.

Methods. Two cohorts of patients notified to NOAR, who satisfied the 1987 ACR criteria for RA at the time of notification (baseline) and who were economically active at the time of RA symptom onset, were identified. Cohort 1 consisted of 160 patients with an onset of RA between 1989 and 1992, and was followed for a mean of 8.6 yr from symptom onset. For 110 of these cases, a control group, matched for age, gender and employment status at baseline, was identified from the local population. Their employment histories were compared in 1995. Cohort 2 consisted of 134 patients with an onset of RA between 1994 and 1997, and was followed for a mean of 4.1 yr from symptom onset.

Results. One-third of RA cohort 1 had stopped working on the grounds of ill health by 1995. The baseline health assessment questionnaire (HAQ) score was the most important predictor of work disability. These patients were 32 times more likely to stop work on health grounds than the matched controls. The rates for work disability for the RA cases 1, 2, 5 and 10 yr after symptom onset were 14, 26, 33 and 39% respectively. For cohort 2, the rates for work disability 1 and 2 yr from onset were 23 and 33% respectively.

Conclusion. Work disability is an important outcome in RA patients of working age. Many people stop working very early in the disease process, often before they are referred to hospital or started on disease-modifying anti-rheumatic drugs. Although the peak rates for work disability are in the early years, people with RA continue to leave the work force several years after onset. Thus, the recent move to earlier, more aggressive treatment has had no effect on the rates of work disability.

KEY WORDS: Rheumatoid arthritis, Work disability, Early inflammatory arthritis, Employment status.

Rheumatoid arthritis (RA) is a chronic disabling condition that may affect the lives of individual patients in many ways. One of the most important outcomes may be work disability—the inability to continue working, to work in the same occupation or to work the same number of hours. There are approximately 22 000 new cases of RA in the UK each year, and 55% of the patients are of working age at the time of symptom onset [1].

Research into work disability has been reported from the USA and from other European countries. It is

difficult to compare the findings of these studies because of differences in the criteria used to define RA, in the methods of recruiting patients under differing systems of health provision, in disease duration and length of follow-up, and in social security systems, which impinge on the definition and timing of work disability. Rates of work disability reported from the USA range from 22 to 85% (Table 1) [2–11]. Results from the main European studies are summarized in Table 2 [12–19]. The common factors associated with work disability fall into three main categories. The first relates to the employment; the nature of the job, the level of physical activity required and the degree of autonomy, particularly over the pace of work, are important. The second relates to the employee; the age at RA onset, marital

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TABLE 1. Summary of USA data on work disability in RA

Reference	Rate of work disability	Factors
Yelin <i>et al.</i> , 1980 [2]	62% at 10 yr	Stage of disease Work autonomy Marital status (married > single)
Pincus <i>et al.</i> , 1984 [3]	85% at 9 yr	
Yelin <i>et al.</i> , 1987 [4]	50% at 10 yr 90% at 30 yr	Physical job No control over pace
Pincus <i>et al.</i> , 1989 [5]	Males 43.9% Females 69%	
Reisine <i>et al.</i> , 1989 [6]	43%	HAQ Lack of autonomy Home factors Physical job Age
Callahan <i>et al.</i> , 1992 [7]	60% at 10 yr	Occupation Age Duration of disease
Reisine <i>et al.</i> , 1995 [8]		Older Female Less educated
Allaire <i>et al.</i> , 1996 [9]	21.7% at 7 yr	Older Less educated Disease duration Physical job More pain Lower salary Worse function
Wolfe and Hawley, 1998 [10]	22% at 5 yr 31.5% at 10 yr	Less formal education More tender joints Higher BMI Higher pain score Poorer grip strength
De Roos and Callahan, 1999 [11]	26.5% at 11 yr	Age Disease duration Education Marital support Poorer function Higher pain score

status and the level of formal education are of significance. The third relates to the disease; the time since RA onset and the level of disability play a part. Other factors, such as joint counts, pain scores and laboratory measures, have little predictive value.

Little research has been done on the effect of RA on employment status in the UK. It has been estimated that the indirect and direct costs of RA in 1992 totalled £1.265 billion, of which £651.5 million (52%) was due to lost earnings [20]. These figures were obtained using a 'top-down' approach. There has been little published work using a 'bottom-up' approach, i.e. starting with the individual patient and measuring the effect on employment status. Our study followed two cohorts of patients with RA of recent onset, recruited by a primary-care-based inflammatory arthritis register, in order to identify changes in work disability rates over time and predictors of change in employment status. It also

TABLE 2. Summary of European work on work disability

Reference	Rate of work disability	Factors
Doeglas <i>et al.</i> , 1995 [12] The Netherlands	42% at 2 yr	Disease-related variables Educational level Manual job HAQ
Mau <i>et al.</i> , 1995 [13] Germany	37% at 7 yr	Older age at onset Functional disability Physical job High erythrocyte sedimentation rate
Fex <i>et al.</i> , 1998 [14] Sweden	37% at 3 yr	HAQ Educational attainment Age at onset
Van Jaarsveld <i>et al.</i> , 1998 [15] The Netherlands	37% at 2.8 yr	
Sokka <i>et al.</i> , 1999 [16] Finland	23% at 2 yr 38% at 10 yr	Age at onset Educational level Physical job Number of swollen joints
Albers <i>et al.</i> , 1999 [17] The Netherlands		
Jantti <i>et al.</i> , 1999 [18] Finland	31% at 1 yr 80% at 20 yr	HAQ
Young <i>et al.</i> , 1999 [19]	40% at 5 yr	Manual workers Age at onset Severity of disease Socio-economic status HAQ

compared the employment experience of patients with recent-onset RA in the early years of disease with that of local controls matched for age, gender and employment status at baseline.

In recent years there has been a move to earlier, more aggressive treatment of RA aimed at preventing and limiting the development of erosive changes in the joints. This changing pattern of treatment might affect employment prospects [21]. A second cohort of patients, whose RA started 5 yr later than that of the first cohort, was compared with the first with regard to changes in employment status.

Methods

Setting

The Norfolk Arthritis Register (NOAR) is a primary-care-based register of people with inflammatory polyarthritis (IP). Since 1 January 1990, all general practitioners (GPs) in the former Norwich Health Authority (population 485 000) have been asked to report to NOAR all adults (aged over 16 yr) whom they see who have IP of two or more joints, with a duration of 4 or more weeks and an onset after 1 January 1989. A parallel notification system operates from the local hospital. A research nurse conducts a structured

interview (which includes information on employment status and occupation), examines the joints and takes blood for the estimation of rheumatoid factor (RF), and visits patients at home. In addition, the patient completes a Health Assessment Questionnaire (HAQ). This is a validated self-administered questionnaire about physical function [22]. The patients are then followed annually. The 1987 American College of Rheumatology (ACR) classification criteria for RA [23] are applied after the baseline assessment.

Procedures

Two cohorts of RA patients were recruited. In both cohorts the patients were eligible for inclusion if they had been notified to and met the entry criteria for NOAR and had satisfied the ACR criteria for RA at the baseline assessment. Cohort 1 had an onset of symptoms between 1989 and 1992 and was economically active at the time of disease onset and before onset; 1989 was used as the baseline year. Cohort 2 had an onset of symptoms between 1994 and 1997 and was economically active at the time of onset. Patients were classified as being economically active if they fell into one of the appropriate groups listed by the Office for National Statistics (Table 3) [24].

Controls

During 1994/5 a case-control study was conducted by NOAR which examined various aetiological hypotheses [25]. Cases were patients notified to NOAR who were aged 18–70 yr and had a symptom duration of less than 12 months. For each case, an age- and gender-matched control was selected at random from the local Family Health Services Authority list (a pooled list of the patients of all local GPs). If the first control to be approached failed to respond, a second was approached, and so on. One hundred and sixty-five controls were

identified in this way, and they also formed the pool of controls for cohort 1 in the present study. For each of the patients eligible for inclusion in this employment study, we attempted to identify a control who was matched for gender and age (± 3 yr). In addition, the controls had to be in employment in 1989 and at the time of onset of disease of their respective case.

Postal questionnaire

A postal questionnaire was developed, validated and then distributed to all patients in cohort 1 and controls during 1994/5. The questionnaire covered changes in employment status since 1989, including changes in hours at work, job title, nature of job, reasons for stopping work, and educational attainment. Job titles were coded using national codes [24] and were used to assign social class. Women were assigned to a social class based on their own occupations rather than those of their partners. Information with regard to employment status was collected via the routine annual NOAR follow-up for cohort 2.

Statistical analysis

Data were entered using dBaseIV and analysed with SPSS [26] and Stata [27]. Univariate and multivariate analyses were performed by unconditional logistic regression to identify predictors of work disability. Results are expressed as odds ratios (OR) and 95% confidence intervals (CI). Conditional logistic regression (which retains matching) was used to estimate odds ratios and the 95% CI for the case-control analysis.

Results

Cohort 1: RA patients

Seven hundred and ninety patients were notified to NOAR between 1989 and 1992, of whom 355 met the

TABLE 3. Definitions of economic activity and inactivity (OPCS, 1980) [5]

Economically active	
1.	Persons in employment Persons with a paid job or self-employed or working in a family business. Temporary, part-time or casual employment is included. Persons absent from their employment due to holidays, strikes, lockouts, short-time working or temporary stoppage are regarded as employed. Persons off sick are regarded as employed if their job is waiting for them on their return
2.	Persons out of employment (a) waiting to take up a job already accepted (b) seeking work (c) prevented by temporary sickness from seeking work
Economically inactive	
1.	Permanently sick or disabled Persons, whether or not previously in employment, not now seeking employment because of permanent sickness or disability. Persons also included are those who have spent more than 6 months in a chronic sick or psychiatric hospital.
2.	Wholly retired from employment Formerly employed persons who have ceased working and are no longer seeking further employment
3.	Housewives Persons engaged entirely in unpaid domestic duties
4.	Full-time student at an educational establishment not provided by an employer
5.	Other persons economically inactive All persons who have never been in employment and are not now seeking employment and those who have spent more than 6 months in prison. Persons also included are those of independent means or who are engaged entirely on unpaid domestic work even though they have had paid work at some time.

1987 ACR criteria for RA at the baseline assessment. One hundred and seventy-three patients fulfilled the criteria for entry to the employment study. By the time the employment questionnaire was distributed in 1994/5, five patients had died, five had withdrawn from the project and three had been lost to follow-up. Results are presented on the remaining 160 patients (114 female, 46 male). The response rate to the questionnaire was 83.7% (134) after one reminder. For the 26 non-responders, data from the NOAR baseline and follow-up forms were used when they were available. The cohort was reviewed again in 1999 to ascertain further changes in their employment status. Data were collected in 1999 by questionnaire and from NOAR annual assessments. Data were available on 149 (106 female, 43 male) (93.1%) of the original 160 patients. Two had died, six declined further contact and three had been lost to follow-up.

The mean age at onset of the 160 patients was 47.8 yr (s.d. 9.6) for women and 51.6 years (s.d. 12.4) for men. The mean time from symptom onset to first review was 4.2 yr (s.d. 1.1). One hundred and forty people (88%) were married or living as married, and the remainder were either single or had been married and were now living alone. All were working at the beginning of the study and the majority were in social class III (Table 4). By the time of the first review, 52 (32.5%) had permanently stopped working on health grounds (Table 5). Six people (3.7%) never went back to work after symptom onset, 23 people (14.4%) stopped work within 12 months of onset and 45 (28.1%) within 3 yr of symptom onset. In addition to those who stopped work completely, nine had changed their jobs and 14 (all women) had reduced their hours of work.

TABLE 4. Social class distribution of the 160 RA subjects and of the 52 who stopped work because of their RA (cohort 1)

Social class	Baseline social class status (%)	Social class status of those who stopped work due to RA (% of baseline)
I (professional)	0	0
II (intermediate)	48 (18.8)	14 (29.2)
III NM (skilled non-manual)	39 (24.4)	9 (23.1)
III M (skilled manual)	36 (22.5)	12 (33.3)
IV (semi-skilled)	28 (17.5)	13 (46.4)
V (unskilled)	9 (5.6)	4 (44.4)
Total	160 (100)	52 (32.5)

TABLE 5. Work status of cohort 1 at follow-up in 1995 and 1999 and cohort 2 in 1999 (%)

	Cohort 1: 1995 (%)	Cohort 1: 1999 (%)	Cohort 2: 1999 (%)
Working	84 (52.5)	57 (36.9)	81 (60.4)
Unemployed	3 (1.9)	0	0
Temporarily off sick	2 (1.3)	0	0
Permanently stopped work due to RA	52 (32.5)	62 (41.6)	50 (37.3)
Retired (not because of health)	16 (10.0)	27 (18.1)	2 (1.5)
Houseperson	3 (1.9)	3 (2.0)	1 (0.7)
Total	160 (100)	149 (100)	134 (100)

Univariate analysis demonstrated that a high baseline disability score (HAQ ≥ 1.50) was associated with an increase of almost 3-fold in the odds of stopping work (OR 2.98, 95% CI 1.43, 6.23) (Table 6). Older age at symptom onset (≥ 50 yr), leaving school early (age < 16 yr) and lower social class (IIIM, IV and V) were also associated with increased odds of stopping work, although this increase did not reach statistical significance.

Additional occupational factors reported by those with work disability included expected rate of work, especially factory production-line work; the physical layout of the workplace; access to work, including transport systems; the physical demands (even if not heavy manual); and the attitude of colleagues, supervisors and managers and the support they offered.

Clinical features recorded at baseline such as RF positivity and the active joint count (swollen and tender) were not associated with increased odds of stopping work (Table 6).

Multivariate analysis emphasized the importance of baseline HAQ (Table 6). Having an HAQ score of 1.50 or more at baseline was associated with a 3-fold increase in the odds of stopping work (OR 3.15, 95% CI 1.47, 6.73). Lower social class and older age at symptom onset were also associated with an increase of approximately 2-fold in the odds of stopping work, although this only bordered on statistical significance. In the multivariate model, male gender was not associated with increased odds of stopping work (OR 1.01, 95% CI 0.46, 2.24). The slight increased odds seen univariately (OR 1.16, 95% CI 0.56, 2.38) may be explained by the higher proportion of men aged 50 yr or older at symptom onset and the higher proportion who were in the lower social classes. Age at leaving school was recorded for only 123 patients and was therefore not included in the multivariate analysis.

The median time from onset to second review in 1999 was 9.1 yr (s.d. 1.0). A further 10 (6.3% of the original cohort) had stopped working because of their RA, bringing the total to 41.6% (Table 5). Of the additional 10, six were in non-manual jobs.

Matched control cohort

Matched controls were found for 110 of the cases (68.8%) (39 male, 71 female). A higher proportion of the controls was in non-manual occupations (65 vs 57%), but this difference was not statistically significant

TABLE 6. Risk factors for stopping work (cohort 1)

		Total	Number who stopped work	Univariate		Multivariate	
				OR	95% CI	OR	95% CI
HAQ score	< 1.50	119	31	1.00		1.00	
	≥ 1.50	41	21	2.98	1.43, 6.23	3.15	1.47, 6.73
Social class	≥ III NM ^a	87	23	1.00		1.00	
	≤ III M ^b	73	29	1.83	0.94, 3.58	1.86	0.92, 3.75
Age at onset	< 50	80	21	1.00		1.00	
	≥ 50	80	31	1.78	0.91, 3.48	1.84	0.90, 3.78
Female		114	36	1.00		1.00	
Male		46	16	1.16	0.56, 2.38	1.01	0.46, 2.24
Age left school (yr)	≥ 16	46	10	1.00		–	
(n = 123)	< 16	77	28	2.06	0.89, 4.77	–	
RF	Negative	65	19	1.00		–	
(n = 144)	Positive	79	25	1.12	0.55, 2.29	–	
Number of swollen and tender joints	0–5	80	28	1.00		–	
	≥ 6	80	24	0.80	0.41, 1.54	–	

(Table 7). All the RA cases and controls were economically active in 1989 and at the onset of disease of the NOAR case. However, by 1995 the employment status of the two groups had diverged (Table 8). Only 58.2% of the RA cases were still economically active compared to 80.0% of the controls. Six (5.5%) of the cases and 10 (9.1%) of the controls were made redundant during the study period. The cases were much more likely (32.7%) to be economically inactive because of permanent sickness or disability, or early retirement on health grounds, than the controls (2.7%) (OR_{matched} = 32.0, 95% CI 5.4–1303). The mean age for permanently stopping work on health grounds was 59.3 yr for the controls and 49.8 yr for the cases (difference 9.5 yr, 95% CI 0.3–18.7). Among the cases, those in manual occupations were more likely to stop working, whereas social class had no comparable effect in the controls (Table 9).

Cohort 2: RA patients

Four hundred and forty-five patients were notified to NOAR between 1994 and 1997, of whom 184 met the 1987 ACR criteria for RA and were of working age. By the end of 1999 they had been followed by NOAR for at least 2 yr from onset. One hundred and thirty-four (82 female, 52 male) were economically active at onset. Data were collected from NOAR annual assessments and from hospital records

The mean age at onset of the 134 patients was 47.7 yr (S.D. 11.0) for females and 51.4 yr (S.D. 10.3) for males. The mean time from onset to follow-up was 4.1 yr (S.D. 1.0). By this time, 50 (37.3%) were work-disabled because of RA. Eighty-one were still in employment, two had retired and one had returned to full-time household duties. Thirty-two (23%) had stopped work within 1 yr of onset and 44 (32.8%) within 2 yr of onset (Table 5).

Hospital referral and the commencement of second-line drugs

One hundred and thirty-seven of the 160 (85.6%) patients in cohort 1 had been referred to a rheumatologist by 1994/5. The median time from onset to first hospital appointment was 7 months (range 1–59). Forty-

TABLE 7. Social class distribution of the 110 cases and controls (cohort 1)

Social class	RA cases (%)	Community controls (%)
I	0 (0)	0 (0)
II	38 (35)	42 (38)
III NM	25 (23)	30 (27)
III M	27 (25)	31 (28)
IV	16 (15)	6 (5)
V	4 (4)	1 (1)
Total	110	110

Overall $\chi^2 = 7.28$ ($P = 0.12$).
 χ^2 test for trend = 3.18 ($P = 0.07$).

TABLE 8. Employment status of the RA cases and controls in 1995

Employment status	RA cases (%)	Controls (%)
Working	60 (54.5)	82 (74.5)
Unemployed	3 (2.7)	4 (3.6)
Off sick (temporarily)	1 (0.9)	2 (1.8)
Permanently stopped work due to RA	36 (32.7)	3 (2.7)
Retired	9 (8.2)	13 (11.8)
Housewife	1 (0.9)	4 (3.6)
Student	0	2 (1.8)
Total	110	110

four (84.6%) of those who became work-disabled were referred with a median interval from onset to first appointment of 8 months (range 1–44). In cohort 2, recruited later, the same proportions were referred but with a slightly shorter interval: 6 months (range 1–34) for the whole cohort and 5 months (range 1–24) for the work-disabled group (Table 10).

By the time of the first follow-up (in 1994/5), 104 patients (65%) of cohort 1 had been prescribed disease modifying anti-rheumatic drugs (DMARDs), with a median interval from onset to commencement of DMARD of 10 months (range 1–80). A higher proportion (75%) of the 52 work-disabled individuals was on DMARDs but the interval was the same. A slightly higher (70.2%) proportion of the later cohort 2 had

TABLE 9. Relationship between social class and employment status for cases and controls

Social class	Cases		Controls	
	Baseline	Economically inactive due to health in 1995	Baseline	Economically inactive due to health in 1995
Non-manual (I–III N)	63	17 (27.0%)	72	2 (2.9%)
Manual (III M–V)	47	19 (40.4%)	38	1 (2.6%)

TABLE 10. Cohorts 1 and 2: mean intervals (months) from onset to first hospital appointment, commencement of DMARDs and to stopping work

	Cohort 1		Cohort 2	
	Total cohort (n = 160)	Work-disabled (n = 52)	Total cohort (n = 134)	Work-disabled (n = 50)
Interval from onset to 1st appointment: median (range)	7 (1–59)	8 (1–44)	6 (1–34)	5 (1–24)
Interval from onset to DMARDs: median (range)	10 (1–80)	9.5 (1–57)	8 (1–36)	6 (2–36)
Interval from onset to stopping work: median (range)		9 (0–63)		7.5 (0–62)

commenced DMARDs by the time of their follow-up in 1999. There was a median interval of 8 months (range 1–36) from onset to starting a DMARD for the whole group. Eighty per cent of those who were work-disabled had been prescribed DMARDs, at a median interval of 6 months (range 2–36) from onset. However, the median interval from disease onset to stopping work had also fallen from 9 months (range 0–63) in cohort 1 to 7.5 months (range 0–62) in cohort 2.

Discussion

It is clear from this study that patients with RA may stop working very soon after symptom onset. Six months after they last worked they will have the status of 'long-term disabled' and be eligible for financial benefits. In cohort 1, of 160 patients who were working at the time of symptom onset, 14.4% had stopped working on health grounds within 12 months of symptom onset, 26.3% within 2 yr and 41.6% within 9 yr. In the later cohort 2, despite earlier commencement on DMARDs, the rates of work disability were 23.9 and 32.8% at years 1 and 2. Many patients took the decision to stop working before they had been referred to hospital or had been started on a DMARD. In the interval between the recruitment of the two cohorts, there had been a reduction in the intervals from onset to first hospital appointment and to commencement of DMARDs, but there was also a reduction in the mean interval from onset to stopping work.

These figures are lower than some rates of work disability reported from hospital-based cohorts of early RA patients, who might be expected to have higher rates because of more severe disease. Fex *et al.* [14] reported a prevalence of work disability of 37% at around 3 yr from onset in a group of 106 early RA patients in Sweden who were working at the time of onset. Doeglas *et al.* [12] reported that 55% of 119 RA patients in the northern part of The Netherlands who were working at disease onset were no longer able to work because of their RA a mean of 1.8 yr after disease onset. A further

8% were working reduced hours. More recently published papers report rates of work disability of 37% at 7 yr [13], 37% at 2.8 yr [15], 23% at 2 yr [16] and 31% at 1 yr [18]. The only other British study reported a work disability rate of 40% at 5 yr [19].

Studies of the predictors of work disability in RA produce remarkably similar results regardless of their country of origin. Age at onset and level of educational achievement/years of formal education are important socio-economic predictors of employment outcome [6–12, 14, 16]. The erythrocyte sedimentation rate, number of swollen joints and disability as measured by the HAQ are important disease-related predictors [2, 10–13, 16, 19]. In this study, baseline HAQ was the only statistically significant predictor of work disability.

Factors related to the nature of the work are more difficult to examine and analyse quantitatively. Individuals in manual jobs [6, 9, 12, 13, 16, 19] and those with less work autonomy [2, 4] are more likely to stop working. Ease of access to the workplace has also been identified as being relevant [28]. The present study identified manual workers as being at increased risk of work disability, but also noted a wide range of other contributing factors, such as the pace of work, the physical limitations imposed by the workplace and access to it, and the contribution that colleagues, supervisors and managers make to maintaining employment.

The state of the local labour market and prevailing economic conditions are factors which have not been examined before. This study is the first to recruit an age- and gender-matched cohort of local controls, and has demonstrated conclusively that RA patients are more at risk of losing their jobs. Albers *et al.* [17] compared the prevalence of work disability in their RA cohort with that in the general Dutch population and found it to be seven times as high. Our study also compared two cohorts with onsets 5 yr apart and demonstrated that, despite the changing treatment pattern in RA, the rate of work disability actually increased. This raises fundamental questions about what advice and support

patients should be given concerning their employment. It suggests that, at a very early stage after the onset of RA, those individuals who are working need a very careful analysis of their work, their workplace, their work commitments and their plans and aspirations. Any delay at this stage potentially compromises their chances of remaining economically active even if their disease then improves.

This study highlights one of the most important economic consequences of RA. Even if no further work disability occurs in cohort 1, the 160 RA patients will have lost 646 potential working years and in the later cohort 2 the 134 patients will have lost 670 potential working years between them. The study illustrates the importance of the baseline HAQ as a predictor of subsequent outcome in RA and highlights the need to discuss employment options with patients soon after disease onset.

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