CONCISE REPORT

Work disability in early rheumatoid arthritis: higher rates but better clinical status in Finland compared with the US

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Objective: To analyse and compare work disability attributed to rheumatoid arthritis in two cohorts of patients with early disease: one in the US and the other in Finland.

Patients and methods: Two cohorts of patients who were working and aged <65 years at the time of their first symptom of rheumatoid arthritis were studied: 269 patients in Nashville, TN, USA (median age 46 years, 72.5% females), and 364 patients from Jyväskylä, Finland, (median age 47.1 years, 70.9% females). The cohorts were analysed and compared for measures of clinical status and work disability status over a median (interquartile range) of 38.9 months in Nashville and 48.4 months in Jyväskylä.

Results: The probability of working at 36 months was 0.89 (0.84–0.92) for patients from Nashville and 0.84 (0.80–0.88) for patients from Jyväskylä (p = 0.02). These rates were lower than in earlier decades. Patients from Jyväskylä had significantly higher rates of work disability (p = 0.02) than those from Nashville, but better scores for self-report physical function (p<0.001), pain (p<0.001) and global status (p<0.001) at last observation. The likelihood of being disabled from work was 2.6-fold higher in Jyväskylä compared to Nashville (95% confidence interval 1.44 to 4.59, p = 0.001), after adjustment for demographic and disease-specific variables.

Conclusion: Rates of work disability in both early rheumatoid arthritis cohorts were improved from earlier decades, but differed significantly in two different social systems. Higher work disability rates with better clinical status was seen in the Finnish early rheumatoid arthritis cohort than in the US cohort.

Rheumatoid arthritis is an inflammatory chronic disease that affects 0.5–1% of the population, many of whom develop disease as working-age adults. Work disability is therefore a major clinical problem for people with rheumatoid arthritis, and the most prominent basis for costs of disease.[1–3] In cohorts analysed prior to 2000, 20–30% of patients received work disability payments within the first two years of disease.[4 5]

Over the last two decades, treatment of rheumatoid arthritis has evolved from a ''reactive'' to a ''preventive'' strategy, with early use of methotrexate, old disease-modifying antirheumatic drugs (DMARDs) and biological agents, often used as combination treatments, with a goal of inducing remission.[6] Aggressive strategies seem to result in substantially improved patient status at this time compared with earlier periods,[7] including evidence of positive benefits on work capacity. One report documented that patients who received an aggressive initial treatment with a combination of DMARDs, including sulfasalazine, methotrexate and hydroxychloroquine, had lower work disability rates than patients who received DMARD monotherapy.[8] Another report indicated that patients who were treated with etanercept had higher employment rates and more working hours per week than those not treated with etanercept.[9]

The availability of an early rheumatoid arthritis cohort from the US and an inception cohort of patients with rheumatoid arthritis from Finland provided an opportunity to study contemporary work disability rates in patients with early rheumatoid arthritis in two different social systems. This report presents analyses of work disability rates in the two databases compared to clinical status variables.

PATIENTS AND METHODS

Patients from Nashville, USA

In 2001–2, 384 patients from Nashville with rheumatoid arthritis for <3 years were enrolled into an Early Rheumatoid Arthritis Treatment Evaluation Registry database.[10] These patients were evaluated at baseline according to a Standard Protocol to Evaluate Rheumatoid Arthritis, which includes three pages regarding data on classification criteria, comorbidities, extra-articular manifestations, surgeries, laboratory results, work status, all drugs used for rheumatoid arthritis, and joint counts, which were all completed by TS.[11] Patients complete a multidimensional health assessment questionnaire, which includes scores for physical function, pain, global status and fatigue.[12] A self-report questionnaire, including information on work disability, was completed every 6 to 12 months subsequently at a clinical visit or by mail. The 269 patients (70.1%) in the cohort who were working and <65 years of age at the time of their first symptom are included in the present analyses.

Patients from Jyväskylä, Finland

Since 1997, all new patients in Jyväskylä, Finland with early rheumatoid arthritis have been enrolled into an inception cohort, with baseline information similar to that of the Nashville cohort. Follow-up data have also been obtained from clinical visits and annual mailed self-report questionnaires. During 1997–2003, 747 patients were entered into this cohort, which accounts for all new patients with rheumatoid arthritis in Jyväskylä Central Hospital Rheumatology Clinic, Jyväskylä, Finland. Among those patients, 364 (48.7%) were working and <65 years of age at the time of their first symptom and are included in the primary analyses in this report.

Abbreviations: DMARD, disease-modifying antirheumatic drug; IQR, interquartile range

Work disability

The onset of work disability is defined as the self-reported final date on which the patient was working, followed by continuous work disability attributed to rheumatoid arthritis on a patient self-report questionnaire. Data were not available on other possible compromised capacities for full-time work activities, including absence from work and sick leave.

Statistics

Differences in demographic and disease characteristics were compared in the two cohorts. Continuous variables are reported as medians and interquartile ranges (IQR), and categorical variables as percentages. Statistical significance was analysed using the Mann–Whitney U test and Pearson's χ^2 test for continuous and categorical variables, respectively.

Analyses included all patients who were <65 years of age and working at the time of the first symptom. Time to disability was assessed in the two cohorts using Kaplan–Meier plots and evaluated using the log rank test. Categorical variables were analysed as two dichotomous patient groups, and continuous variables were divided into four categories based on quartiles. Cox proportional hazard regressions were computed to compare the time to disability between the two cohorts: firstly, as univariate variables and, secondly, adjusting for possible confounding variables. Differences in disability between the two cohorts were expressed as hazard ratios (HRs) and 95% confidence intervals (CIs). Cox–Snell residuals were used to assess the proportional hazard assumption.

RESULTS

Patients

The study cohorts included 269 patients with rheumatoid arthritis in Nashville, who had symptoms for a median (IQR) of 5 (3–12) months at the time of diagnosis and had a disease duration of 18 (8–30) months at the time of the baseline evaluation. The 364 patients from Jyväskylä had a median (IQR) disease duration of 6 (3–13) months at the time of diagnosis, which was the time of the first evaluation in this cohort. All patients were working and were <65 years of age at the time of their first symptom of rheumatoid arthritis. At the baseline evaluation, 36.8% patients from Nashville and 73.6% of patients from Jyväskylä had duration of disease of <1 year. Since diagnosis, patients were followed for a median (IQR) of 38.9 (19.3–52.7) months in Nashville and 48.4 (23.7–74.5) months in Jyväskylä.

Table 1 presents the demographic and disease characteristics of the patients. A higher proportion of patients from Nashville had performed sedentary work, had a positive rheumatoid factor test, and received methotrexate, biological agents or prednisone compared with patients from Jyväskylä. Patients from Jyväskylä reported significantly lower levels of pain ($p<0.001$), fatigue and global status ($p<0.001$) at their last observation compared with patients from Nashville.

Work disability analyses

Table 2 presents unadjusted HRs for work disability according to patient characteristics. A higher unadjusted hazard ratio for work disability was seen in both cohorts according to female sex, lower educational level, positive rheumatoid factor, extra-articular disease, as well as poorer scores for physical function, pain and global status. An increased hazard for work disability was seen in older patients compared with younger patients in Finland, but not in the US.

The probability of continuing to work at 1, 2, 3 and 4 years was 92%, 89%, 89% and 88%, respectively, in Nashville compared with 92%, 86%, 84% and 80%, respectively, in Jyväskylä. These figures differ significantly ($p = 0.02$). The unadjusted HR for discontinuing work in Jyväskylä versus Nashville was 1.62 (95% CI 1.07 to 2.46, $p = 0.02$; table 3). The HR for work disability in Jyväskylä versus Nashville was 2.58 (95% CI 1.44 to 4.59, $p = 0.001$), adjusted for age, years of education, positive rheumatoid factor test, time to first treatment with a DMARD, extra-articular disease, and last reported multidimensional health assessment questionnaire, pain, fatigue and global status. The higher ratio for the adjusted HR compared with the unadjusted ratio reflects the better clinical status but higher likelihood of work disability in patients from Jyväskylä.

DISCUSSION

The rates of work disability of 88% in Nashville and 80% in Jyväskylä after 4 years of rheumatoid arthritis are lower at present compared with historical cohorts[5] in which the probability of continuing to work was 58–82% in patients with rheumatoid arthritis with a mean disease duration of 1 to 3 years. The cohort from Jyväskylä had better scores for functional status, pain and global status, but a higher risk of being work disabled attributed to their disease compared with patients from Nashville. These findings extend pioneering observations of Yelin, and confirmed by others,[2 13–15] that differences in work disability rates may be explained only in small part by traditional variables associated with disease clinical severity. The most likely explanatory variable of differences in patient status and work disability in our study seem to be differences in the social systems in the two countries.

In the US, an individual applies for work disability payments to the agency for Social Security Disability Insurance. Medical information is collected from all the doctors seen by the patient. The evaluation process may include an additional doctor's examination. Patients must not be working for at least one year to be awarded disability payments, during which time the patient receives neither salary nor disability payments, unless private disability insurance is available. Health insurance is generally paid by the employer. If a patient leaves his or her job, health insurance must be privately paid until the patient finds a new job or is awarded work disability payments, and thereby becomes eligible for Medicare, the government old-age health insurance programme. Many patients have no private insurance, and availability of medical insurance provides a major incentive to continue working for the same employer. If a patient is awarded work disability payments, patients generally remain ''work disabled'', regardless of health status, as they may have considerable difficulty in obtaining private health insurance because of ''prior conditions''.

In Finland, there is a statutory national health insurance system. The government is responsible for sickness allowances and national pensions. If a resident becomes temporarily unable to perform his or her regular job or another similar job because of an illness, he or she is entitled to a sickness allowance as compensation for lost income. This allowance is available to people from 16 years of age until the official retirement age of 65 years, and can be awarded to employed and self-employed people, as well as to people who are unemployed. Public disability pensions are managed under the same rules, and are granted to any person whose working capacity is judged to be permanently reduced by at least 50% because of illness, injury or defect. An application for a sickness allowance or pension requires a comprehensive medical certificate from the treating rheumatologist. If the patient remains unable to work after 1 year, a permanent work disability pension can be granted.[8 16] Health insurance coverage does not depend on the patient's work status.

Work disability was regarded traditionally until the 1980s (and in some localities at this time)[17] as a direct consequence of severe clinical status, according to a biomedical model,

Table 1 Comparison of characteristics of patients who were working at the time of their first symptoms of rheumatoid arthritis in Nashville, Tennessee, USA and Jyväskylä, Finland

	Nashville*			Jyväskylä†			
	Total, n = 269	Work disabled, n = 31	Employed, n = 238	Total, n = 364	Work disabled, n = 86	Employed, n = 278	p Value‡
Demographic variables							
Age at first symptom§	46.1 (38.5–53.3)	44.2 (34.5–48.6)	46.3 (38.7–53.7)	47.1 (36.6–53.0)	51.9 (47.7–56.2)	45.0 (33.9–51.6)	0.99
Female¶	195 (72.5)	22 (71.0)	173 (72.7)	258 (70.9)	64 (74.4)	194 (69.8)	0.66
Years of education	12 (12–15)	12 (12–14)	12 (12–16)	11 (9–14)	10 (9–11)	12 (9–15)	<0.001
Caucasians¶	240 (89.2)	23 (74.2)	215 (91.1)	357 (100)	86 (100)	271 (100)	<0.001
Sedentary work	130 (48.3)	10 (32.3)	120 (50.4)	130 (35.7)	16 (18.6)	114 (41.0)	0.001
Disease characteristics							
Positive rheumatoid factor	177 (68.6)	24 (85.7)	153 (66.5)	175 (48.3)	48 (56.5)	127 (45.9)	<0.001
Disease duration (months)	17 (9–29)	22 (6–31)	17 (9–29)	6 (3–13)	6 (3–12)	7 (3–13)	<0.001
Time to first DMARD (months)§	6.7 (3.3–14.1)	3.9 (2.0–10.8)	7.0 (3.9–15.2)	6.1 (3.1–12.2)	6.1 (3.1–12.2)	6.3 (3.1–12.2)	0.94
Methotrexate ever¶	241 (89.6)	28 (90.3)	213 (89.5)	259 (71.2)	69 (80.2)	190 (68.4)	<0.001
Biological ever¶	31 (11.5)	7 (22.6)	24 (10.1)	24 (6.6)	10 (11.6)	14 (5.0)	0.03
Prednisone ever¶	227 (84.4)	30 (96.8)	197 (82.8)	209 (57.4)	61 (70.9)	148 (53.2)	<0.001
Extra-articular disease ever¶	13 (4.9)	3 (9.7)	10 (4.2)	11 (3.0)	4 (4.7)	7 (2.5)	0.23
Patient questionnaire measures							
Pain on the Visual Analogue Scale at baseline (0–100)§	41.0 (19.0–63.0)	70.0 (45.0–80.0)	37.5 (16.0–62.0)	40.0 (23.0–61.0)	51.5 (36.0–71.0)	36.0 (18.0–53.5)	0.84
Patient global assessment at baseline (0–100)§	40.5 (17.5–53.5)	56.0 (45.0–78.0)	35.0 (15.0–51.0)	34.0 (20.0–52.0)	45.0 (33.0–61.0)	32.0 (16.0–49.0)	0.42
Modified health assessment questionnaire at baseline (0–3)§	0.4 (0.0–0.9)	0.9 (0.6–1.4)	0.3 (0.0–0.8)	0.4 (0.1–0.6)	0.6 (0.3–0.9)	0.3 (0.0–0.6)	0.35
Pain on the Visual Analogue Scale at last observation (0–100)§	38.0 (16.0–63.0)	48.0 (36.0–69.0)	36.0 (15.0–62.0)	21.0 (6.0–41.0)	35.0 (20.0–51.0)	15.0 (4.0–35.0)	<0.001
Fatigue at last observation (0–100)§	46.0 (17.0–70.0)	65.0 (35.0–80.0)	43.0 (16.0–66.0)	24.0 (7.0–48.0)	40.0 (21.5–59.5)	18.0 (6.0–45.0)	<0.001
Patient global assessment at last observation (0–100)§	36.0 (11.0–56.0)	53.0 (30.0–71.0)	34.0 (10.0–51.0)	25.5 (11.0–46.0)	38.5 (25.0–54.0)	22.0 (8.0–40.0)	0.002
Morning stiffness at last observation (0–301)§	30.0 (5.0–120.0)	60.0 (22.5–120.0)	30.0 (3.0–120.0)	30.0 (0.0–60.0)	60.0 (30.0–120.0)	15.0 (0.0–60.0)	0.004
Modified health assessment questionnaire at last observation (0–3)§	0.4 (0.0–0.9)	0.9 (0.5–1.3)	0.3 (0.0–0.9)	0.1 (0.0–0.4)	0.4 (0.1–0.6)	0.0 (0.0–0.3)	<0.001
Follow-up (months)§	38.9 (19.3–52.7)	4.4 (1.0–12.7)	40.7 (25.9–56.6)	48.4 (23.7–74.5)	17.5 (6.5–53.3)	58.1 (31.6–77.3)	<0.001

DMARD, disease-modifying antirheumatic drug.
*Missing data from Nashville: time to first DMARD (n = 3), modified health assessment questionnaire at baseline (n = 5), pain on Visual Analogue Scale at baseline (n = 4), patient global assessment at baseline (n = 5), pain on Visual Analogue Scale at last observation (n = 31), fatigue at last observation (n = 32), patient global assessment at last observation (n = 29), morning stiffness at last observation (n = 45), modified health assessment questionnaire (n = 45), extra-articular disease (n = 2).
†Missing data from Jyväskylä: time to first DMARD (n = 11), modified health assessment questionnaire at diagnosis (n = 35), pain on Visual Analogue Scale at diagnosis (n = 43), patient global assessment at diagnosis (n = 43), fatigue at last observation (n = 19), patient global assessment at last observation (n = 16), morning stiffness (n = 59), modified health assessment questionnaire (n = 21).
‡p Value for comparison of Nashville (total) with Jyväskylä (total).
§Values are median (interquartile range).
¶ Values are frequency (%).
**Wilcoxon rank sum test for continuous and χ^2 for categorical variables.

Table 2 Unadjusted HRs (95% CI) for work disability in patients with early rheumatoid arthritis by cohort (Nashville, Tennessee USA, and Jyväskylä, Finland)

Demographic variables	Nashville* (n = 269)	Jyväskylät (n = 364)
Age (years)		
36–45 *v* ⩽35	0.3 (0.1 to 1.1)	1.7 (0.6 to 4.8)
46–55 *v* ⩽35	0.8 (0.3 to 1.9)	6.2 (2.5 to 15.4)
>55 *v* ⩽35	0.2 (0.1 to 1.1)	19.4 (7.5 to 49.9)
Male *v* female	0.8 (0.3 to 2.1)	0.8 (0.5 to 1.4)
Years of education		
12 *v* <12	0.6 (0.2 to 1.7)	0.5 (0.3 to 1.1)
>12 *v* <12	0.3 (0.1 to 0.9)	0.2 (0.1 to 0.4)
Non-Caucasian *v* Caucasian	3.6 (1.5 to 8.6)	NA
Non-sedentary/sedentary work	2.0 (0.9 to 4.5)	2.5 (1.4 to 4.3)
Disease and drugs characteristics		
Positive/negative rheumatoid factor	2.2 (0.7 to 6.3)	1.5 (0.9 to 2.3)
Disease duration 5–8 months *v* ⩽ 4 months	0.6 (0.2 to 2.1)	1.1 (0.6 to 1.9)
9–24 months *v* ⩽4 months	0.3 (1.0 to 0.9)	0.8 (0.4 to 1.4)
>24 months *v* ⩽4 months	0.4 (0.1 to 1.2)	0.3 (0.1 to 0.7)
Ever/never methotrexate use	1.2 (0.3 to 5.2)	1.7 (1.0 to 2.9)
Ever/never biological use	2.1 (0.9 to 5.4)	1.8 (0.9 to 3.5)
Ever/never prednisone use	5.1 (0.7 to 37.8)	2.2 (1.4 to 3.7)
Any/none extra-articular disease	1.9 (0.5 to 8.1)	1.3 (0.4 to 4.2)
Patient questionnaires		
Pain at first assessment		
21–40 *v* ⩽20	4.1 (0.4 to 39.7)	22.9 (3.1 to 169.2)
41–60 *v* ⩽20	12.6 (1.6 to 99.5)	16.2 (2.2 to 122.7)
⩾61 *v* ⩽20	15.9 (2.1 to 121.9)	36.4 (5.0 to 267.9)
Patient global assessment at first assessment		
21–35 *v* ⩽20	4.8 (0.5 to 46.4)	2.4 (1.0 to 5.7)
36–50 *v* ⩽20	8.0 (1.0 to 66.2)	4.0 (1.8 to 9.0)
⩾51 *v* ⩽20	20.0 (2.6 to 150.8)	4.2 (1.9 to 9.4)
MHAQ at first assessment		
0.1–0.6 *v* 0	2.3 (0.5 to 11.0)	1.3 (0.6 to 2.7)
⩾0.6 *v* 0	3.2 (0.7 to 14.3)	1.5 (0.7 to3.2)
Pain at last observation		
11–25 *v* ⩽10	1.1 (0.2 to 6.5)	2.5 (1.2 to 5.3)
26–50 *v* ⩽10	2.5 (0.5 to 11.8)	3.9 (2.0 to 7.9)
⩾51 *v* ⩽10	2.4 (0.5 to 10.8)	3.7 (1.8 to 7.7)
Fatigue at last observation		
11–30 *v* ⩽10	1.0 (0.2 to 4.7)	2.6 (1.2 to 5.5)
31–60 *v* ⩽10	1.0 (0.2 to 4.0)	3.3 (1.6 to 6.7)
⩾60 *v* ⩽10	2.0 (0.6 to 7.2)	4.4 (2.0 to 9.6)
Global at last observation		
11–30 *v* ⩽10	0.9 (0.2 to 3.9)	4.5 (1.6 to 13.0)
31–50 *v* ⩽10	1.0 (0.2 to 3.9)	6.9 (2.4 to 19.8)
⩾51 *v* ⩽10	2.8 (0.9 to 8.7)	6.8 (2.3 to 19.7)
MHAQ at last observation		
0.1–0.6 *v* 0	1.0 (0.3 to 3.3)	3.7 (2.1 to 6.8)
⩾0.6 *v* 0	2.4 (0.8 to 6.7)	7.3 (3.6 to 14.7)
Time to first DMARD (months)		
3.1–6.0 *v* ⩽3	0.5 (0.2 to 1.4)	1.5 (0.7 to 2.9)
6.1–12.0 *v* ⩽3	0.5 (0.2 to 1.3)	1.1 (0.5 to 2.4)
⩾12.1 *v* ⩽3	0.2 (0.1 to 0.7)	0.7 (0.3 to 1.4)

DMARD, disease-modifying antirheumatic drug; MHAQ, multidimensional health assessment questionnaire.

correlated with clinical features of disease activity and damage, including swollen or tender joints, radiographs and laboratory results. The application process for work disability in the US continues to emphasise this approach, with a detailed joint range of motion and laboratory tests, and patients who do not work have poorer status compared with those who continue to work with regard to joint counts, radiographs and laboratory tests.[15] However, demographic variables such as age, education and occupation, as well as duration of disease, functional status variables, physical

Table 3 Adjusted HRs for work disability in patients with early rheumatoid arthritis: Jyvaskyla, Finland, versus Nashville, Tennessee, USA

	Nashville (n = 269)	Jyväskylä (n = 364)	p Value
No of patients on disability	31	86	
Time of follow-up (median (IQR)), months	38.9 (19.3–52.7)	48.4 (23.7–74.5)	
Unadjusted HR (95% CI; n = 625)	1.0	1.61 (1.07 to 2.46)	0.024
Adjusted HR (95% CI;* n = 607)	1.0	1.81 (1.16 to 2.82)	0.009
Adjusted HR (95% CI;† n = 541)	1.0	2.58 (1.44 to 4.59)	0.001

DMARD, disease-modifying antirheumatic drug; MHAQ, multidimensional health assessment questionnaire; RA, rheumatoid arthritis; RF, rheumatoid factor.
*Adjusted for RF, age, sedentary work, time to first DMARD and extra-articular RA.
†Adjusted for RF, age, sedentary work, time to first DMARD and extra-articular RA, last MHAQ, last pain, last fatigue, last patient global and years of education.

demand and time control issues at work, and family variables appear more explanatory of work or disability status than clinical status measures.[1 14] In one study, if scores were known for physical function, occupation, age and duration of disease, other clinical status measures, including joint counts, radiographs and laboratory tests, did not add to the explanation of a patient's work or disability status.[15]

Differences between work disability rates between Finland and the US reported in this manuscript seem consistent with the results of a recent study of patients with ankylosing spondylitis, in which considerable differences in work status were observed among three different European countries.[18] The influence of physical function, clinical status measures and socioeconomic conditions on employment in various rheumatic disease conditions, including early rheumatoid arthritis, may differ according to differences in sociocultural characteristics of each country.[19] Further analyses of such differences may lead to more enlightened policies and improved patient outcomes.

This study has several limitations. Firstly, the population included in the analyses is from only two cities, one in the US and one in Finland. Therefore, the generalisability of the findings to their respective countries, or to other countries, requires availability of data from other sites. Unfortunately, few sites have complete data concerning patients outside clinical trials. Secondly, missing data could have biased the results. However, the model with or without missing data showed similar results (table 3), indicating that this is not a major problem. Thirdly, patients from Jyväskylä included all those seen in the area, whereas patients seen in Nashville represented only patients seen in a private practice and by one rheumatologist at Vanderbilt University. Possibly, a higher proportion of patients in the Nashville database might have been work disabled if more indigent patients had been included. Nonetheless, the evidence of better function and higher work disability in Finland would persist even if more indigent patients from Nashville were available. Indeed, this trend would likely have been stronger with more disadvantaged patients, as patients with low socioeconomic status have poorer clinical status.[20 21]

We conclude that work disability rates in two cohorts in Finland and the US seem lower at this time in both settings than in previous decades.[5] This finding seems to reflect the better clinical status of contemporary patients, resulting in part from early aggressive treatments or milder rheumatoid arthritis at this time. Nonetheless, work disability in patients with early RA remains a significant problem. The likelihood of work disability is influenced not only by differences in demographic, labour and clinical status characteristics but also by differences in social systems.

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