Work disability in Finnish patients with rheumatoid arthritis: a 15-year follow-up

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Abstract

Objectives

To investigate long-term work disability of patients with early rheumatoid arthritis (RA) and to examine impact of early disease activity and radiological progression on the loss of final work capacity.

Methods

Work disability due to RA was studied over 15 years in 86 Finnish patients with early RA and available for the labour force at study entry. RA-related retirement was studied in relation to early disease activity defined as the 28-joint disease activity score area under curve (DAS28 AUC) during the first 12 months and the impact of early radiological progression from the baseline to year 1.

Results

The RA-related retirement rate was 7% after the first year, 11% after 2 years, 19% after 5 years, 33% after 10 years and 39% after 15 years. Of the patients with low disease activity (DAS28 AUC ≤3.2) none were retired during the first 3 years. The retirement rate was also lower in subsequent years (10% after 5 years, 14% after 10 years, and 27% after 15 years) among these patients compared to those with DAS28 AUC >3.2 (28%, 55%, and 64%, respectively). A similar trend was evident among patients with no radiological progression (≤1 unit increase in Larsen score) and those with >1 Larsen unit of progression during the first year of RA.

Conclusions

Our study suggests that low disease activity and halting of radiological progression during the first year of the disease improve possibilities to maintain work capacity in RA during the subsequent 15 years.

Key words

rheumatoid arthritis, work disability, disease activity, radiological progression

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Introduction

Work disability has been regarded as one of the important long-term outcomes in rheumatoid arthritis (RA). Loss of work capacity has substantial economic and social consequences for both patients and society (1-4). In earlier studies about half of the patients have been of working age at the onset of RA, some of whom have been already work disabled (5-7). According to previous, mostly cross-sectional studies, 22–40% of patients retired or stopped working due to RA within 5 years of the disease onset, and 30–60% of patients after 10 years disease duration (8). Two longitudinal studies have reported work disability rates of 44% and 60% after 15 years disease duration (6, 9). In one longitudinal study, 80% of patients with early seropositive RA became work disabled during the 20-year follow-up period (10).

Functional disability, as measured with the Health Assessment Questionnaire (HAQ), appears to be the best predictor for permanent work disability (1, 6, 8). Disease activity and radiological joint damage are known to be determinants of functional capacity (11, 12). In the early phase of RA, loss of functional capacity is related mainly to pain and functional limitations due to inflammation. In long-standing RA, joint damage becomes more prominent, often leading to permanent functional and work disability.

We studied permanent work disability due to RA longitudinally in a Finnish cohort of early RA patients over a 15-year period. We focused on disease-related determinants of work capacity, which can be improved by the treatment. The rate of retirement due to RA was studied in relation to disease activity and radiological joint damage during the early phase of the disease.

Patients and methods

Patients

The study population consisted of 87 patients with early RA collected between 1986 and 1989 in Helsinki, Finland and followed up prospectively over a 15-year period. At the onset of the study, all patients fulfilled the 1958 American Rheumatism Association (ARA) criteria for definitive RA (13), and later during the follow-up period were confirmed to have also met the 1987 American College of Rheumatology (ACR) criteria for RA (14). A total of 69 females (79%) and 18 males with a mean age (range) of 44 (18-65) years and a mean duration of symptoms (range) of 8 (2–12) months were included; 57 (65%) of the patients were rheumatoid factor (RF) positive. Only patients who were still working or available in the labour force were included in the study. One female patient was later excluded from the study due to revised diagnosis (Behçet's disease).

Treatment with disease-modifying antirheumatic drugs (DMARDs) was initiated at the outset of the study for all but one patient, and each patient was treated individually and intensively according to the "saw-tooth" strategy (15) as described in detail elsewhere (16). Combination therapy was used when monotherapy proved ineffective. A low-dose oral glucocorticoid treatment (≤10 mg prednisolone) was used in the active phase of the disease. Biological agents after being available were used from the year 2000 for those patients with severe disease and an unsatisfactory treatment response to conventional DMARDs.

The initial investigators (LP and ML-R) followed all patients every 3 months during the first year and every 4 months for up to 3 years. Later the patients were also followed and treated mainly by the initial investigators. Those patients experiencing long-standing remission were referred to primary health care or occupational health services for follow-up. All patients were invited to 5-, 7-, 10-, and 15-year follow-up evaluations.

Clinical activity

At the outset of the study, the disease activity was assessed based on the number of tender joints (53 joints/28 joints) and the number of swollen joints (44 joints/28 joints). Disease activity scores based on 28 joints (DAS28) (17) were calculated retrospectively with three parameters at baseline and at every 3 months during the first 12 months to evaluate the disease activity (DAS28 area under the curve) dur-

ing the first year of the disease. In our study HAQ was recorded not until the third year of the study.

Radiological assessment

Radiographs of the hands and feet were examined at the outset of the study and at 1, 2, 3, 5, 7, 10, and 15 years and scored according to the method of Larsen *et al*. (18) as described previously (19). The maximum of the total Larsen score was 200. The disease was defined as erosive if the patient had at least one joint with a Larsen score (LS) of grade 2 or higher (20). An increase of ≥2 Larsen units between two sequential sets of radiographs was considered relevant to radiological progression (21). We studied the radiological progression during the first year of RA and evaluated its impact on work disability.

Work disability

The date and the type of disability pension (full-time or part-time disability pension) as well as data of the old age pensions were collected from the medical records and work disability certificates of each patient. According to the Finnish statutory national health security system, a person may apply for a work disability pension if his or her work incapacity persists for at least one year and prevents the person from participating in gainful employment or working in the household. In Finland the work disability pensions are granted by the authorised pension providers or by the Social Insurance Institution of Finland. The decision of granting a pension is made by authority doctor of these institutions on the basis of a doctor's statement made by the treating doctor of the patient. In the statement patient's permanent joint damage, functional capacity and physical limitations are evaluated in relation to physical demands of his or her work. The grounds of the work disability pensions have not remained unchanged. In the 1970s and 1980s patients with active early polyarthritis together with physically demanding work could often receive positive decision on a work disability pension. Today evidence of permanent joint damage and permanent loss of functional capacity is demanded before retirement and rehabilitation attempts should be performed before permanent pensions are granted.

The number of patients retired due to RA (either full-time work disability pension or part-time disability pension) was evaluated longitudinally during the 15-year follow-up period. The decision regarding heavy physical work was based on each patient's occupation; if needed questions about the physical demands of work (lifting or carrying heavy loads, heavy manual labour and standing for long hours) were asked during the 15-year follow-up visit.

Ethics approval

This study was conducted with the approval of Helsinki University Central Hospital's ethics committee, Helsinki.

Statistical analysis

The number of patients who were retired during the 15-year follow-up period was expressed as percentage of all patients. Retirement analysis was based on a Kaplan-Meier estimation, and the Cox proportional hazards regression model served to estimate adjusted risks for retirement. The baseline demographics and clinical data of retired and still-working patients were expressed as means (SD) or medians (IQR). Statistical comparison between different groups was performed with the Chi-Square test, the Fisher-Freeman-Halton test, the Kruskal-Wallis test or analysis of variance (ANOVA). The normality of variables was evaluated using Shapiro-Wilk statistics.

Table I. Anti-rheumatic treatment of all 86 patients at the onset of the study and of the 70 patients examined after 15 years of RA.

	At the onset of the study n=86	After 15-years n=70
DMARD monotherapy	86 (100%)	30 (43%)
Intramuscular gold	67 (78%)	1 (1.4%)
Sulphasalazine	14 (16%)	3 (4.3%)
Hydroxychloroquine	5 (6%)	3 (4.3%)
Methotrexate		15 (21.%)
Azathioprine		2 (2.%)
Cyclosporine		0 (0%)
Podophyllotoxine		1 (1.4%)
Leflunomide		5 (7.1%)
DMARD combination		22 (31%)
Biological drug		3 (4%)
Without DMARDs		15 (21%)

Results

At the study entry all 86 patients included in the final analysis were working or available in the labour force. At the time of the 15-year examination, all of the 10 (12%) patients who had died, had retired before their decease and included in final analysis. Of the six patients (7%) who did not attend the 15-year examination, 3 had retired during their follow-up period, and the employment or retirement of the 3 remaining patients was verified by phone at the time of 15-year evaluation.

The initial drug treatment of the whole study population and the antirheumatic treatment of the 70 patients who participated the 15-year examination are presented in Table I. In addition to their DMARD therapy 20 (29%) of the 70 patients examined at 15 years used low-dose oral glucocorticoids. The mean total DMARD treatment time of these 70 patients was 73% of their mean follow-up time and the mean number of different DMARDs or DMARD combinations was 5.1. Of the 15 patients who were without any DMARD during 15-year examination 11 were in remission and four had discontinued their treatment due to adverse effects.

During the 15-year follow-up period 42 (49%) of the 86 patients had retired due to loss of working capacity. Most of them [38/42 (90%)] were on a full-time disability pension. Four (10%) patients were working part-time (part-time disability pension). RA was the main cause for the retirement in 34/38 (81%) of patients with work disability pension.

The Kaplan-Meier estimated cumulative work disability due to RA during the 15-year follow-up period appears in Figure 1. After the first year of the disease, the Kaplan-Meier estimated (95% CI) retirement due to RA was 7% (3–16); after 2 years, 14% (8–24); after 5 years, 21% (13-32); after 10 years, 37% (27–49) and after 15 years, 47% (36–60). The estimated age and sex adjusted risk for RA-related retirement during 15 years for RF-positive patients was 53% (95% CI: 39-69), and for RF-negative patients, 37% (95% CI: 22–58). Eight (9%) patients were retired for other diseases (coronary artery disease, myocardial infarction, cerebral infarction, peripheral artery disease, aortic aneurysm, liver transplantation due to cirrhosis, breast cancer or depression).

Altogether 14 (16%) of the patients received an old age pension, 28 (33%) were working full-time, and 2 (2%) were unemployed. The baseline demographic and disease-related variables of the patients retired due to RA, the patients retired due to old age or for other reasons as well as the employed patients appear in Table II. The employed patients were younger, better educated, and more often RF-negative than those who were retired. No differences in marital status or physically demanding work were evident between the employed patients and the patients retired due to RA. The baseline disease activity was highest among those patients who lost their ability to work due to RA.

We evaluated the impact of disease activity during the first year of RA on long-term work disability in 84/86 patient with complete data of disease activity during the first year of the disease. The DAS28 area under the curve (AUC) during the first 12 months was calculated, and the inability to work due to RA was studied in two groups: patients with low disease activity (DAS28 AUC ≤3.2) and patients with moderate or high disease activity (DAS28 AUC >3.2). During the 15-year follow-up 64% of the 53 patients with moderate or high disease activity during the first year of RA received disability pension because of RA: 12% of them during the first year, 25% during the first 3 years, 28% during the first 5 years, and 55% during 10 years. Of the 33 patients with low disease activity, only 27% were retired due to RA; none of them were retired during the first 3 years, only 10% during the first 5 years, and 14% during 10 years. The Kaplan-Meier estimated cumulative RA-related retirement in both disease activity groups appears in Figure 2. Of the 10 patients with high disease activity (DAS28 AUC >5.1) during first year of RA, 40% became work disabled during the first year of RA, 60% were retired at year 2, 70% at year 5, and all of them before year 10.

The impact of early radiological progression on RA-related work disability was evaluated in two groups: 28 patients with no radiological progression during the first year of RA [early radiological remission (LS increase ≤1 Larsen unit per a year)] and 58 patients with progressive joint damage (LS increase ≥2 Larsen units per a year). The Kaplan-Meier estimated cumulative retirement due to RA remained lower in the patients with early radiological remission (12% at year 5, 28% at year 10, and 33% at year 15) than in those with progressive joint damage (25%, 43% and 54%, respectively); see Figure 3.

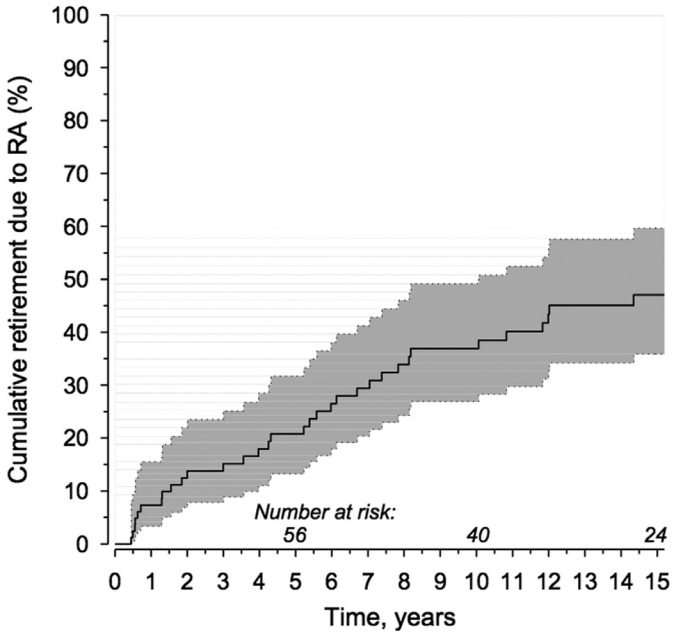

Fig. 1. Cumulative work disability of patients with rheumatoid arthritis (RA) during the 15-year follow-up based on a Kaplan-Meier estimate with 95% confidence intervals.

Table II. Baseline characteristics, disease activity, and radiographic joint damage of the employed patients and the retired patients.

	Patients still working n=30	Patients retired for other reasons n=22	Patients retired due to RA n=34	*p*-value
Sex, female, n (%)	25 (83)	15 (68)	28 (82)	0.39
Age, mean (SD), years	34 (9)	57 (6)	46 (9)	<0.001
Only basic education, n (%)	5 (17)	13 (59)	12 (35)	0.007
Heavy physical work, n (%)	17 (57)	7 (32)	17 (50)	0.19
Living alone, n (%)	9 (30)	3 (14)	3 (8)	0.15
Disease duration, median (IQR), months	8 (5,10)	8 (6,11)	8 (4,12)	0.86
Rheumatoid factor present, n (%)	14 (47)	19 (86)	24 (71)	0.009
DAS28 at baseline, mean (SD)	4.11 (0.98)	4.50 (1.15)	5.02 (1.11)	0.004
Larsen score at baseline, mean (SD)	2.6 (3.7)	5.7 (6.5)	5.7 (7.9)	0.067

Discussion

In our cohort, the RA-related work disability rate over 15 years seems to be lower (39%) than in the earlier studies (44–60%) (6, 9). Comparison between the studies and between countries however, is complicated due to differences in the study populations, the study design, the definition of work disability and divergences in the social security systems. In general, work disability

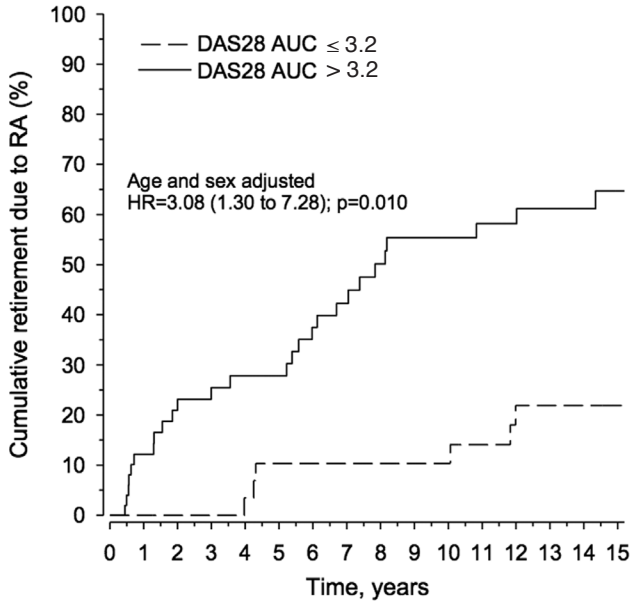

Fig. 2. Kaplan-Meier estimated RA-related retirement in relation to early disease activity [DAS28 area under the curve during the first 12 months (DAS28 AUC)] over 15 years in a Finnish cohort of 84 patients with early RA.

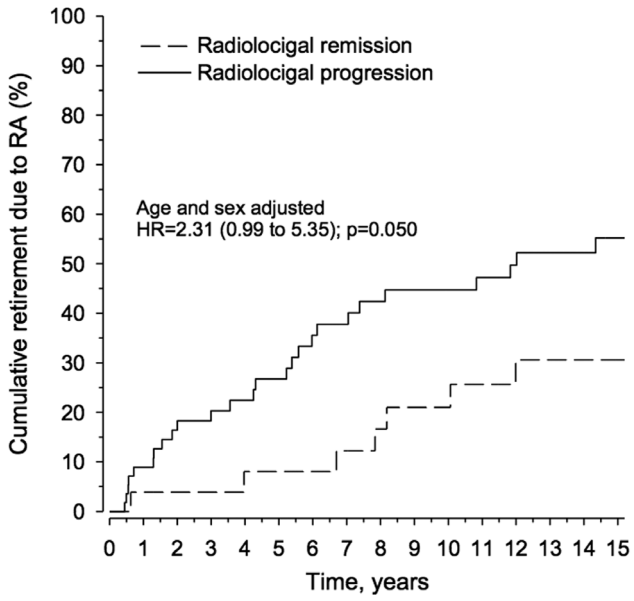

Fig. 3. Impact of early radiological progression on work disability. Kaplan-Meier estimated RA-related retirement in patients with early radiological remission [Larsen score (LS) increase ≤1 unit during the first year of RA)] and patients with early radiological progression (LS increase at least 2 units during the first year of RA) over 15 years.

rates are higher in European countries than in the U.S. (8, 22). In two recent studies from Sweden and the US, this was still evident (6, 23). To focus on the work disability, we chose to include only patients of working age and who were available in the labour force. Consequently, the mean age at baseline in our study was lower than in most other longitudinal studies (8).

Work disability due to RA has been studied in three other longitudinal Finnish studies with comparable symptom durations (mean 6–8 months) and mean ages (40–46 years) at study entry. These studies from the Rheumatism Foundation Hospital in Heinola (10), from the Jyväskylä Central Hospital (24), and the Finnish Rheumatoid Arthritis Combination Therapy (FIN-RACo) trial (25) are presented in Table III. The proportion of women was much the same (62–79%) in all the studies as was the proportion of RF-positive patients (65–72%), with the exception of the Heinola cohort (100%). As RF positivity has been proved to be a marker of severe and progressive disease, the high number of work disabled in the Heinola cohort stems most likely from the inclusion of only RF-positive patients in this study.

Though the studies appear to be quite similar in terms to baseline demographics, their study designs and treatment strategies differed considerably. In the Heinola cohort in the 1970s either intramuscular gold or hydroxycholroquine was started as first therapy, without any strict plan (treatment strategy) to substitute the drug in the case of inefficacy or intolerability. In the Jyväskylä cohort and in our cohort the treatment strategies were more ambitious. The patients were treated with DMARD monotherapy for the first years of the study and later according to "saw-tooth" strategy. In our study the patients were treated individually and intensively by changing the DMARD immediately in case of ineffectiveness or an adverse effect, which was not a common strategy in the 1980s. The FIN-RACo trial was a prospective, randomised study, which compared the efficacy and tolerability of combination therapy and DMARD monotherapy with fixed protocol for up to 2 years. The target in both treatment arms was remission and the drugs were changed in the case of inefficacy or adverse events.

In the FIN-RACo study more patients (29%) in the monotherapy group retired prematurely on a permanent disability pension than in the combination group (20%) during the five-year follow-up (26). None of the patients in clinical remission at either 6 months or 12 months experienced permanent work disability during the first 5 years of RA (25). We unfortunately have no data of functional capacity during the first two years of follow-up. Instead of HAQ we evaluated association of early disease activity and of radiological progression with later work ability. The disease activity during the first 12 months of RA was assessed with DAS28 AUC. The patients whose disease activity was low retired due to RA significantly less frequently and later in the disease course than did those with moderate or high disease activity. Our results over 15 years are consistent with the 5-year results of the FIN-RACo study, thus emphasising the importance of aiming to remission or at least to low disease activity during the early phase of RA. In addition, the prevention of early

Table III. Work disability in RA in Finnish longitudinal studies.

Cohort/Study	Time of collection	Number of patients	Disease duration, years	Work disability rate, %
Heinola (10)	1973-1975	107	1	31
			3	32
			8	43
			20	80
Jyväskylä (24)	1983-1985 and	82	2	19
	1988-1989		10	38
Helsinki	1986-1989	86	1	7
			2	11
			5	19
			10	33
			15	39
FIN-RACo (25)	1993-1995	199	5	25

joint damage seems important when aiming to maintain patients' working capacity (see Fig. 3).

Several studies have pointed out that increasing age, RF positivity, physically demanding work or psychosocial circumstances are predictors for loss of work capacity in patients with RA (8, 27). As physicians, we are unable to influence these factors. However, we can aim to suppress disease activity and to prevent permanent joint damage as much as possible. In a recent register study from Finland (28) has shown that in the 2000s work disability during the two first years of RA is getting more infrequent in later patient cohorts of the decade (2004–2005 and 2006–2007) than in the 2000–2001 and 2002–2003 cohorts. The incidence of RA related work disability (%) was nearly halved from 2000–2001 (8.9%) to 2006–2007 (4.8%). There are several possible factors to account for this change. There is general impression among doctors and in patient associations that the grounds of granting work disability pensions have became more strict over the 2000s compared to earlier decades. At the same time the use of methotrexate and DMARD combinations was increased in Finland and tumour necrosis factor inhibitors became available (29).

This register data and the earlier results of the FIN-RACo suggest the importance of early and intensive DMARD treatment to prevent work disability in RA. In the FIN-RACo study the achievement of early remission appeared to maintain patients' work ability during the first 5 years. In our cohort low disease activity during the first year of RA improved patients´ possibilities to remain able to work during 15-year follow-up. In these two studies this was possible in a portion of patients even with traditional DMARDs. In 2000s the introduction of biological agents have increased tools to treat RA and to improve long-term outcomes in RA. Recent short-term studies (30-32) have shown a preliminary signal that TNF-α-inhibitors may prevent loss of work ability both in established and early RA, however this needs to be confirmed in longitudinal randomised studies.

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