Work Disability in Rheumatoid Arthritis — Development Over 15 Years and Evaluation of Predictive Factors Over Time

KERSTIN EBERHARDT, BRITT-MARIE LARSSON, KERSTIN NIVED, and ELISABET LINDQVIST

ABSTRACT. ***Objective.*** To investigate work disability rates over 15 years in an early rheumatoid arthritis (RA) cohort and to evaluate predictive factors during the course of the study.

Methods. All patients with early RA of working age (n = 148) were followed and treated at a team care unit. Mean disease duration at inclusion was 1 year. Work characteristics and disease-related variables were recorded annually. Logistic regression analyses were performed to identify predictors for work disability after 5, 10, and 15 years.

Results. Work disability rates were 28%, 35%, 39%, and 44% at study start and after 5, 10, and 15 years, respectively. Forty-seven patients reduced working hours and 34 changed work tasks during the study time. Older age, less education, heavy manual work, and much activity limitation assessed by Health Assessment Questionnaire (HAQ) were predictors of work disability. Demographics and work factors had best predictive value in the early phase, while HAQ was a strong predictor at all points in time. Odds ratios for baseline HAQ, 5 year HAQ, and 10 year HAQ were 6.3, 9.6, and 4.1 for work disability after 5, 10, and 15 years, respectively.

Conclusion. The prevalence of work disability was 28% at inclusion. After 15 years' followup the prevalence was 44%, which is lower than previously reported. HAQ was the single prognostic factor with strong predictive value throughout the study. (First Release Feb 1 2007; J Rheumatol 2007;34:481–7)

Key Indexing Terms:
RHEUMATOID ARTHRITIS WORK DISABILITY PREDICTION
LONGITUDINAL STUDY HEALTH ASSESSMENT QUESTIONNAIRE

Work disability is a common adverse outcome of rheumatoid arthritis (RA). This has a great influence on both the individual and society. Patients may, for instance, experience loss of social role and lower self-esteem[1]. They may also have both less income and more expenses[2-5]. Further, a large part of the RA-related community costs are directly derived from work disability[6-8].

Work disability frequently occurs early in the course of the disease. A number of prospective studies have shown that as many as 20–35% of patients had to stop working due to their arthritis within 2–3 years after disease onset[9-12]. After 6–10 years' disease duration, the reported work disability rates have varied from 22% and 42% in different study populations[11-14]. Recent prospective early RA studies have so far not described the development of work disability for 15 years or more. However, 2 older longitudinal studies from the US and Finland starting in the 1960s and 1970s, respectively, have shown work disability rates between 60% and 90% after 15–20 years[10,15].

It might be difficult to compare results between countries due to, for instance, differences in populations, flexibility of the labor market, and social security systems. It is therefore essential to perform comprehensive assessment of work disability in different countries.

To facilitate prevention of work disability numerous investigations have tried to identify prognostic factors. Older age, physically demanding work, low education, and high levels of self-assessed activity limitation have been the most important risk factors for withdrawal from the labor force[9,11-14,16,17]. On the other hand, biomedical variables have been mainly associative with modest power to predict work disability[12,18]. Emotional distress may also influence work ability, but the predictive value has been limited[9,17].

In the management of patients it is important to have knowledge about the usefulness of different prognostic factors during the course of the disease. The literature regarding this is sparse.

At the Department of Rheumatology in Lund, Southern Sweden, we have an ongoing prospective early RA study. All patients have now been followed and also received team care for 15 years. We report the development of work disability in

From the Department of Rheumatology, Lund University Hospital, Lund, Sweden.

Supported by the Österlund and Kock Foundations, the 80-Year Fund of King Gustav V, and Reumatikerförbundet.

K. Eberhardt, MD, PhD; B-M. Larsson, Social Worker; K. Nived, Social Worker; E. Lindqvist, MD, PhD, Department of Rheumatology, Lund University Hospital.

Address reprint requests to Dr. K. Eberhardt, Department of Rheumatology, Lund University Hospital, SE-22185, Lund, Sweden. E-mail: kerstin.eberhardt@med.lu.se

Accepted for publication November 16, 2006.

detail during the entire followup time in all patients of working age at study start. Further, we evaluated the value of different predictive factors during the course of the study.

MATERIALS AND METHODS

Patients. All patients with definite RA[19] more than 18 years of age and disease duration less than 24 months were included in a prospective study in 1985-89. Most patients were referred from primary care as a result of a special campaign to recruit cases of recent onset[20]. One hundred forty-eight (81%) of a total 183 patients were available for the labor market and constitute the present study group. Disease duration was mean 11.1 (SD 6.1) months at study start.

The patients were followed at least once a year at a team care unit.

Assessment of personal and disease state factors. Joint inflammation was assessed by active joint count (defined as swollen and either tender or painful on motion). The 50 joints evaluated included all but 2 from the Ritchie index (subtalar joints and neck)[21].

Pain during the last week and general health were estimated on visual analog scales (VAS). These scales were horizontal and had a length of 100 mm. The VAS values in millimeters were multiplied by 3 and then divided by 100, thus giving a range of 0–3 for each scale.

Activity limitations were assessed by a validated Swedish version of the Stanford Health Assessment Questionnaire (HAQ) disability index[22].

Radiographic damage was evaluated according to Larsen and Dale[23]. The scoring procedure has been described in detail elsewhere[24]. Briefly, 32 joints in hands and feet were evaluated and each joint was compared to a standard reference radiograph. Changes were graded from 0 to 5 as follows: 0, normal; 1, joint space narrowing, soft tissue swelling, or periarticular osteoporosis; 2–5, increasing degree of erosions and destruction. A joint damage score was calculated by summing all scores, the wrists multiplied by 5, resulting in a range of 0–200.

The Symptom Checklist SCL-90 was applied to evaluate emotional distress during the first 5 years. From this test we used 38 items measuring the dimensions of depression, anxiety, interpersonal sensitivity, and feelings of guilt. As these dimensions are highly correlated, a composite index of distress was formed by averaging the scores of all items. The patients rated their degree of distress on a 5-point scale ranging from 0 (not at all) to 4 (extremely). The psychological tests were as described[25].

Education level was scored on a 3-point scale (≤ 9, 10–11, ≥ 12 yrs).

Assessment of work conditions. We defined work disability as inability to work at all due to arthritis.

The patients evaluated their physical work load on a 3-point scale (very much/rather much/not at all). The social worker was present during this rating and besides telling their occupational title the patients could discuss their work tasks.

Change of work situation was recorded continuously during the study period.

All team members performed vocational assessment at each visit. This included systematic evaluation of problems at work and development of individual solutions.

Social security system. If work disability is supposed to last more than 1 year a patient can get a disability pension. This pension is at first temporary and is reconsidered mostly at 2-year intervals, 2–3 times before becoming permanent. The employer has a responsibility to offer an adapted job if possible.

Treatment. Multidisciplinary team care was administered according to common principles. The team consisted of a physiotherapist, an occupational therapist, a social worker, and a rheumatologist. Each team member could if necessary provide or administer different treatments and social and psychological support.

Patients with active disease were offered treatment with disease modifying antirheumatic drugs (DMARD). The pharmacological treatment strategy changed with time. In the early years of the study most patients were treated with D-penicillamine or antimalarials, while during the last years methotrexate was most commonly used. Eighty-four percent of the patients were prescribed treatment with DMARD at some time during the study period. About 50% received low-dose oral glucocorticoids. Five patients had received biological agents.

Statistical analyses. Comparisons between patients working or not at study start and study finish were analyzed with the Mann-Whitney test or chi-square test when appropriate. The same tests were used to compare baseline and followup data between the 63 patients who remained in the study all 15 years and those who left the working force at earlier stages.

Three subsequent logistic multiple regressions were applied to identify predictors of work disability after 5, 10, and 15 years, respectively. The 5-year analysis was performed with independent variables obtained at baseline, the 10-year analysis with variables obtained after 5 years, and the 15-year analysis with variables obtained after 10 years. Data from all patients in working age at each timepoint were taken into account.

Classification tables and the goodness-of-fit chi-square were used to test the validity of the models.

RESULTS

Development of disability. Figure 1 shows the development of work disability over 15 years in 148 patients of working age at study start. After 15 years, 63 patients remained in the study. During the followup time, 69 patients had retired at normal age. Sixteen patients of working age had dropped out of the study at different points in time (11 had died and 5 moved away). At study start, work disability rate was 28%, after 5 years 35%, after 10 years 39%, and after 15 years 44%.

Figure 2 shows the development of work disability in the subgroup of 63 patients who were followed during the entire study period. Disability rates were lower then for the whole patient sample during the first 10 years (19% both at study start and after 5 years, and 24% after 10 years). At study start these 63 patients were compared to the other 85 patients, who were significantly younger [$p = 0.000$; median (interquartile range) 41 (37–46) yrs vs 54 (50–58) yrs], they were significantly more often men ($p < 0.05$), and they had a significantly higher education level ($p = 0.000$). There were no significant differences in disease state variables.

Work disability progressed most from onset of the disease until inclusion in the study. Most patients who became unable to work remained so during the whole observation period. However, there was a small group of 18 patients who regained work ability, most of them during the first 3 years.

Vocational measures. As a consequence of the vocational assessment at each followup visit, different measures were taken by the team members. The patients could get assistive devices and splints. They could get advice about adjustment of working methods, pace of work, or reduction of working hours. They could get psychological support to cope with their work situation and sometimes encouragement to get another occupation. On a few occasions, workplace visits were performed. If necessary, a patient could be referred to company health services for workplace adjustment and equipment and also for change of work tasks. The different measures to try to keep the patient in the labor force were unfortunately not specifically recorded.

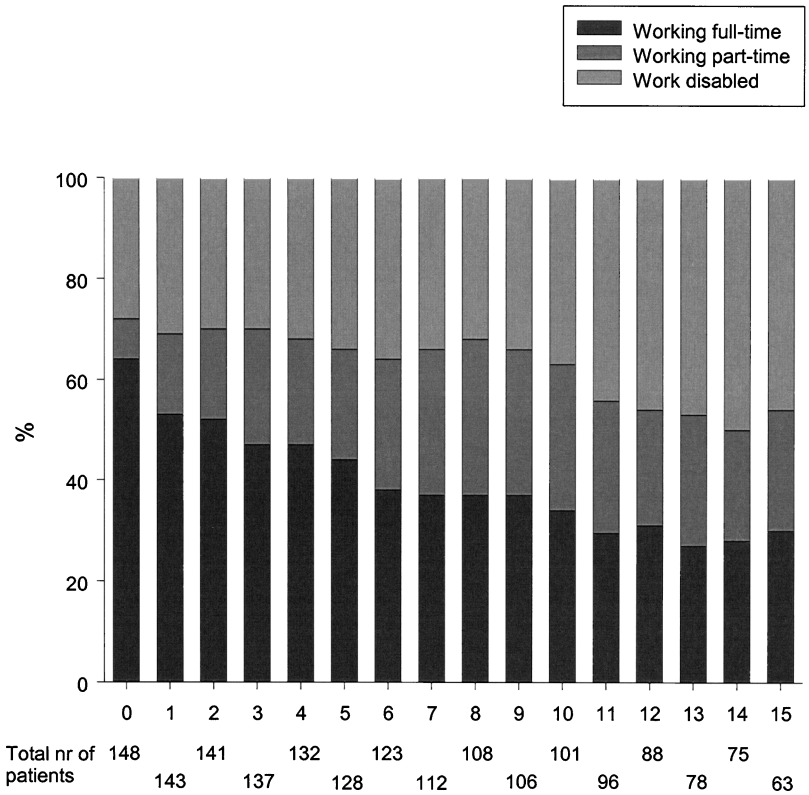

Figure 1. Development of work disability over 15 years in 148 patients with early RA with mean disease duration of 1 year at study start. The number of patients still of working age each observation year is shown below.

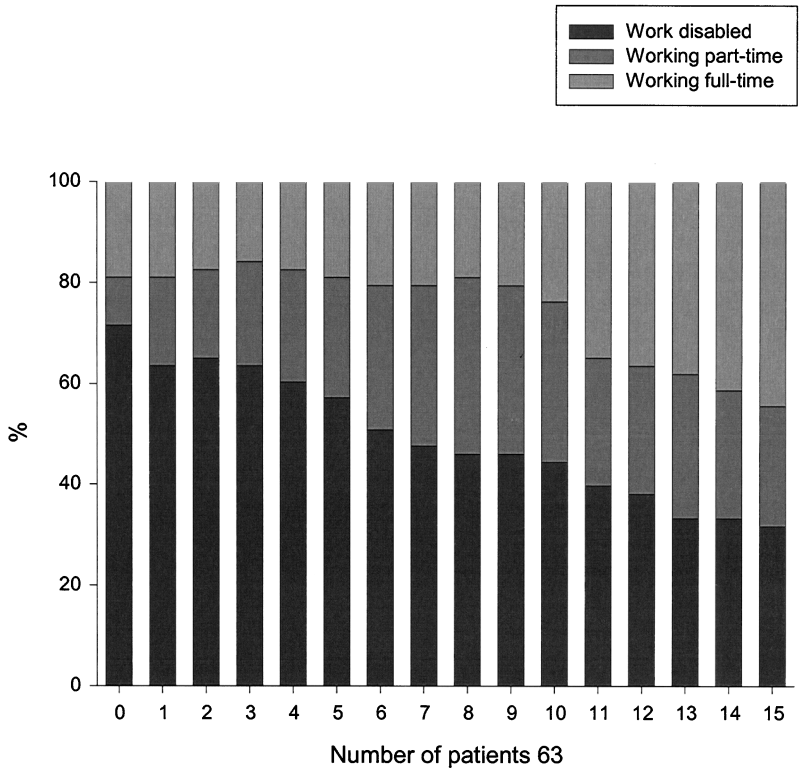

Figure 2. Development of work disability in the 63 patients with early RA who were followed all 15 years.

Forty-seven patients had to reduce working hours and 34 patients had to change work tasks during the observation period. The number of patients who could keep a job with a heavy physical load decreased rapidly with time. After 10 years only 3 patients had such a job and after 15 years, none. Of those who were still employed at the end of the study, 62% had changed work conditions due to their arthritis.

During the entire observation period all but 9 patients were able to keep the same employer and, if necessary, able to get fewer working hours and/or different work tasks at their former job.

Comparisons between patients working or not at study start and finish. Table 1 shows demographics, work load, and disease state divided by work capacity for all patients at study start. Patients not working were older, had less education, and more often had physically demanding work. They had more active disease and more activity limitations, but not more radiographic changes or higher levels of emotional distress. Education level was significantly associated both to physical work load and to older age ($p < 0.001$).

Table 2 shows demographics and disease state variables by work capacity at study finish. The demographic pattern had changed. Age and education level did not differ any longer. However, a significantly higher number of men worked. There was no significant difference in any disease state variable between the sexes. Compared to baseline, disease-related variables did not show the same pronounced difference between patients working and those not working.

There was no difference in degree of emotional distress measured by SCL-90 during the first 5 years, but patients who had made work transitions due to their arthritis had significantly higher levels of emotional distress after 5 years ($p < 0.05$).

Table 1. Demographics, work load and different clinical, laboratory and radiographic data divided by work status at study start in 148 patients with early RA. Mean disease duration was about 1 year. Continuous variables are given as median (interquartile range) and frequencies as numbers.

	Working (n = 107)	Not Working (n = 41)	p
Age, yrs	48 (40–53)	54 (46–59)	0.001
Men/women	38/68	15/27	NS
Educational level (≤ 9/10–11/≥ 12 yrs)	53/21/33	30/4/7	< 0.05
HAQ (0–3)	0.7 (0.4–1.0)	1.0 (0.7–1.4)	< 0.001
Pain (0–3)	1.2 (0.7–1.6)	1.4 (1.2–1.7)	< 0.05
General health (0–3)	1.5 (0.8–1.7)	1.6 (1.5–1.8)	< 0.05
Emotional distress (0–4)	0.3 (0.2–0.6)	0.4 (0.2–0.7)	NS
Active joint count (0–50)	5 (3–9)	7 (4–14)	0.01
ESR	24 (10–38)	41 (28–76)	< 0.001
Rheumatoid factor (neg/pos)	32/75	5/36	< 0.05
Joint damage score (0–200)	5 (2–9)	7 (3–15)	NS
Physical work load (very much/rather much/not at all)	38/36/33	28/10/3	0.001

HAQ: Health Assessment Questionnaire; ESR: erythrocyte sedimentation rate.

Table 2. Comparison of demographics and disease state variables between patients working or not after 15 years.

	Working (n = 34)	Not Working (n = 29)	p
Age, yrs	39 (30–44)	42 (38–47)	0.09
Men/women	12/23	3/25	< 0.05
Educational level (≤ 9/10–11/≥ 12 yrs)	11/9/16	9/5/13	NS
HAQ (0–3)	0.8 (0.4–1.2)	1.4 (0.9–1.9)	< 0.01
Pain (0–3)	0.9 (0.5–1.4)	1.1 (0.6–1.6)	NS
General health (0–3)	0.9 (0.7–1.5)	1.4 (0.8–1.6)	NS
Active joint count (0–50)	1 (0–4)	3 (0–5)	NS
ESR	14 (8–25)	26 (12–49)	< 0.05
Rheumatoid factor (neg/pos)	11/23	6/23	NS

HAQ: Health Assessment Questionnaire.

Prediction. Table 3 shows the logistic regression models with "working or not" as dependent variable at Year 5, 10, and 15. Demographics, work-related factors, and the different clinical, psychological, laboratory, and radiographic data at baseline and at Years 5 and 10 were entered as independent variables in the 3 subsequent models. We considered prediction of work disability at 5-year intervals clinically useful. Throughout the study, the HAQ score was the only disease-related variable that turned out to be significant in the predictive models. The odds ratios were high at all points in time. Age was only significant in the 5-year model, but tended to contribute to prediction at Years 10 and 15 as well. As physical work load and education level were highly correlated, only one of these variables could be selected in the same logistic model. Physical demands had better predictive power at baseline and were entered in the 5-year model. If removed, education level became significant with an odds ratio of 3.5 (95% confidence interval 1.1–11.2). Table 4 shows the classification accuracy of the 3 best models.

Radiographic changes (baseline, 5 and 10 years) had no predictive power at any point in time. Emotional distress measured at baseline and Year 5 did not contribute to the prediction.

DISCUSSION

A main finding in this study is that work disability rate after 15 years was considerably lower than previously reported in older studies[10,15]. More active treatment and team care may have contributed to the better outcome.

Another important observation putting much emphasis on the significance of very early interventions was that work disability rate increased rapidly during the first year of the disease. This was reported already in 1993 for a subsample of our patients[26] and is now confirmed in the entire cohort. The finding is in agreement with others[9-12]. Work disability rates in this cohort during the following 10 years were in the main in keeping with other prospective studies in the same period[11-14].

All the studies performed in many different countries show

Table 3A. Logistic regression model with work capacity as dependent variable in 128 patients who remained in the study after 5 years. 83 patients were working and 45 were not. Demographics, work load and clinical, laboratory, and radiographic data at baseline were entered as independent variables. Only variables with $p \leq 0.10$ are shown.

Variable	B	SE	Sign	Exp (B)	95% CI for exp (B) Lower bound	Upper bound
HAQ at baseline	1.80	0.51	0.000	6.30	2.30	16.90
Age at onset	0.17	0.04	0.000	1.18	1.10	1.30
Work load (no demands compared to much demands)	–1.49	0.65	0.02	0.23	0.10	0.80
Work load (rather much demands compared to much demands)	–1.24	0.59	0.04	0.29	0.09	0.92

Table 3B. Same as A but work capacity after 10 years as dependent variable and demographics and disease state data at 5 years as independent variables. 62 patients were working and 39 were not after 10 years.

Variable	B	SE	Sign	Exp (B)	95% CI for exp (B) Lower bound	Upper bound
Age at onset	0.06	0.04	0.10	1.06	0.99	1.14
Educational level (high level compared to low level)	1.37	0.66	0.04	3.95	1.09	14.3
HAQ at year 5	2.70	0.65	0.000	9.56	2.98	30.67

Table 3C. Same as A but work capacity after 15 years as dependent variable and demographics and disease state data at year 10 as independent variables. 34 patients were working and 29 were not after 15 years.

Variable	B	SE	Sign	Exp (B)	95% CI for exp (B) Lower bound	Upper bound
Age at onset	0.06	0.04	0.09	1.10	0.99	1.20
HAQ at year 10	1.41	0.50	0.005	4.10	1.60	11.0

Table 4. Classification tables for the 3 subsequent logistic regression models. The percentage of patients correctly classified as working or not at each timepoint is shown.

Predictive model	Working	Not Working
Year 5	86%	68%
Year 10	85%	68%
Year 15	80%	63%

that work disability is a serious and common problem for patients with RA. The information including our own is very important as a reference for future intervention studies. At present it might become useful, for instance, in the assessment of the value of biological drugs. There are some indications that these effective but expensive drugs will improve work disability rates in the short time perspective[27]. Taking into account that work disability is the major source of RA-related costs for society[6-8], treatment with biological drugs may in the long run lead to savings that will offset the very high drug costs.

The impact of the disease on work capacity is also reflected by the substantial number of patients who had to change occupational role over the years. This common occurrence of work transitions is confirmed by others[28,29].

It is notable that almost all our patients could keep the same employer. This stability, which is part of employee security in Sweden, was probably crucial to delay the dropping out from the active labor force.

Vocational assessment in team care was possibly also an essential factor to keep the patients employed as long as possible. Some previous studies have indicated that employees with RA were satisfied with advice and measures taken by health professionals and that these helped them to maintain work[30,31].

In accord with previous findings, older age, high physical demands at work, low education level, and a high degree of activity limitation were the best predictors of work disability[9,11-14,16,17,32]. The prospective study design gave an opportunity to assess the usefulness of the predictors at different points in time during followup. In this study the HAQ proved to be clinically very useful. Throughout the study it was a sta-

ble and very strong predictor of work disability. This could perhaps partly be explained by the fact that the HAQ is a complex measure, assessing not only pain and disease activity but also issues related to personality traits and emotional status[33].

The effect of age is shown in Figure 2, illustrating much lower disability rates in the youngest patient group. The largest effect of age on work capacity occurred during the first year after disease onset. It was very difficult for older patients with less education and physically demanding jobs to adjust the work conditions or find other job alternatives. During followup, the further contribution of age to prediction of work disability was small. Education level had predictive power only during the first 10 years, probably reflecting the strong association between age and education level among our patients.

In our study, the patients themselves rated physical demands at work and could discuss their work tasks with the social worker. This probably gave a more accurate rating than use of an occupational title only. Physical demands at work could apparently be used as a prognostic factor only at baseline, when it had a strong predictive power for work disability after 5 years. The further importance of this factor is underlined by the fact that almost all patients who managed to stay employed during the followup time had achieved adjustment of work tasks. The high dropout rate from the labor force during the first year suggests that patients with physically demanding jobs should get support at once to adjust work conditions or find job alternatives. These measures should preferably be taken before work loss, as vocational rehabilitation is most efficient if the patient is still employed[34].

Active joint count, pain score, and laboratory measures at baseline were associated with work status, but had no predictive value, supporting findings in some previous studies[12,18]. However, in other studies one or the other of these variables have contributed to the prediction[11,13,17].

Radiographic changes had no predictive value. The negative finding is in accordance with Callahan, *et al*[18] and Reisine, *et al*[32], but is in contrast to other results from other investigators[10,11,13,14]. The diverging results, besides being from different study populations, may partly be explained by different methods to assess radiographic findings.

The level of emotional distress, which was assessed during the first 5 years, was in general low, with only a minority (12%) showing continuously high levels of stress[25]. This could be one explanation of the lack of association to work disability. A few previous studies have found a modest predictive value of emotional distress[9,17]. Novel measures of, for instance, coping style and helplessness may have better prognostic value, as found in some recent studies[16,35,36].

It is noteworthy that patients in our study who had made work transitions had higher levels of emotional distress after 5 years, indicating a need for more psychological support.

At study finish (Table 2) differences in age and education level between patients working or not working had disappeared. However, a higher proportion of men were still employed, which is in accord with recent findings[16,36]. A possible explanation could be that women in general take more responsibility for housekeeping activities and children. There might also be a difference in work characteristics, with women having lower autonomy, lower income, and higher demands at work[36,37]. Differences in disease-related variables were less pronounced after 15 years than at study start, probably reflecting that patients with active disease were treated with DMARD.

To conclude, in this early RA cohort the prevalence of work disability was 28% at inclusion. After 15 years, the work disability rate had risen to 44%, which is lower than previously reported. Forty-seven patients had to reduce working hours and 34 had to change work tasks due to arthritis during the observation period. Almost all patients kept the same employer. Demographic and work factors contributed to prediction of work disability mainly in the beginning of the study, while the HAQ score was a strong predictor during the whole followup time.

REFERENCES

1. Gaston-Johansson F, Gustafsson M, Felldin R, Sanne H. A comparative study of feelings, attitudes and behaviors of patients with fibromyalgia and rheumatoid arthritis. Soc Sci Med 1990;31:941-7.
2. Fex E, Larsson BM, Nived K, Eberhardt K. Effect of rheumatoid arthritis on work status and social and leisure time activities in patients followed 8 years from onset. J Rheumatol 1998;25:44-50.
3. Albers JM, Kuper HH, van Riel PL, et al. Socio-economic consequences of rheumatoid arthritis in the first years of the disease. Rheumatology Oxford 1999;38:423-30.
4. Lapsley HM, March LM, Tribe KL, Cross MJ, Courtenay BG, Brooks PM, for the Arthritis Cost and Outcome Project Group. Living with rheumatoid arthritis: expenditures, health status, and social impact on patients. Ann Rheum Dis 2002;61:818-21.
5. Wolfe F, Michaud K, Choi HK, Williams R. Household income and earnings losses among 6396 persons with rheumatoid arthritis. J Rheumatol 2005;32:1875-83.
6. Kobelt G, Eberhardt K, Jönsson L, Jönsson B. Economic consequences of the progression of rheumatoid arthritis in Sweden. Arthritis Rheum 1999;42:347-56.
7. Rat AC, Boissier MC. Rheumatoid arthritis: direct and indirect costs. Joint Bone Spine 2004;71:518-24.
8. Hallert E, Husberg M, Jonsson D, Skogh T. Rheumatoid arthritis is already expensive during the first year of the disease (the Swedish TIRA project). Rheumatology Oxford 2004;43:1374-82.
9. Borg G, Allander E, Berg E, Brodin U, From A, Trang L. Auranofin treatment in early rheumatoid arthritis may postpone early retirement. Results from a 2-year double blind trial. J Rheumatol 1991;18:1015–20.
10. Jantti J, Aho K, Kaarela K, Kautiainen H. Work disability in an inception cohort of patients with seropositive rheumatoid arthritis: a 20 year study. Rheumatology Oxford 1999;38:1138-41.
11. Sokka T, Kautiainen H, Möttönen T, Hannonen P. Work disability in rheumatoid arthritis 10 years after the diagnosis. J Rheumatol 1999;26:1681–5.
12. Barrett EM, Scott DG, Wiles NJ, Symmons DP. The impact of rheumatoid arthritis on employment status in the early years of

disease: a UK community-based study. Rheumatology Oxford 2000;39:1403-9.
13. Mau W, Bornmann M, Weber H, Weidemann HF, Hecker H, Raspe HH. Prediction of permanent work disability in a follow-up study of early rheumatoid arthritis: results of a tree structured analysis using RECPAM. Br J Rheumatol 1996;35:652–9.
14. Young A, Dixey J, Kulinskaya E, et al. Which patients stop working because of rheumatoid arthritis: results of five years' follow up in 732 patients from the Early RA Study (ERAS). Ann Rheum Dis 2002;61:335-40.
15. Yelin E, Henke C, Epstein W. The work dynamics of the person with rheumatoid arthritis. Arthritis Rheum 1987;30:507-12.
16. Odegard S, Finset A, Kvien T, Mowinchel P, Uhlig T. Work disability in rheumatoid arthritis is predicted by physical and psychological health status: a 7 year study from the Oslo RA register. Scand J Rheumatol 2005;34:441-7.
17. Wolfe F, Hawley DJ. The longterm outcomes of rheumatoid arthritis: work disability: a prospective 18 year study of 823 patients. J Rheumatol 1998;25:2108–17.
18. Callahan LF, Bloch DA, Pincus T. Identification of work disability in rheumatoid arthritis: physical, radiographic and laboratory variables do not add explanatory power to demographic and functional variables. J Clin Epidemiol 1992;45:127–38.
19. Ropes MW, Bennet GA, Cobb S, Jacox R, Jessar RA. Diagnostic criteria for rheumatoid arthritis. Ann Rheum Dis 1959;18:49-53.
20. Eberhardt KB, Rydgren LC, Pettersson H, Wollheim FA. Early rheumatoid arthritis — onset, course, and outcome over 2 years. Rheumatol Int 1990;10:135-42.
21. Ritchie DM, Boyle JA, McInnes JM, et al. Clinical studies with an articular index for the assessment of joint tenderness in patients with rheumatoid arthritis. Q J Med 1968;37:393-406.
22. Ekdahl C, Eberhardt K, Andersson I, Svensson B. Assessing disability in patients with rheumatoid arthritis. Use of a Swedish version of the Stanford Health Assessment Questionnaire. Scand J Rheumatol 1988;17:263-71.
23. Larsen A, Dale K, Eek M. Radiographic evaluation of rheumatoid arthritis and related conditions by standard reference films. Acta Radiol Diagn (Stockh) 1977;18:481–91.
24. Lindqvist E, Jonsson K, Saxne T, Eberhardt K. The course of radiographic damage over 10 years in an early rheumatoid arthritis cohort. Ann Rheum Dis 2002;62:611-6.
25. Persson L-O, Larsson B-M, Nived K, Eberhardt K. The development of emotional distress in 158 patients with recently diagnosed rheumatoid arthritis: a prospective 5-year follow-up study. Scand J Rheumatol 2005;34:191-7.
26. Eberhardt K, Larsson BM, Nived K. Early rheumatoid arthritis: some social, economical, and psychological aspects. Scand J Rheumatol 1993;22:119-23.
27. Yelin E, Trutpin L, Katz P, Lubeck D, Rush S, Wanke L. Association between etanercept use and employment outcomes among patients with rheumatoid arthritis. Arthritis Rheum 2003;48:3046-54.
28. Gignac M, Badley E, Lacaille D, Cott C, Adam P, Anis A. Managing arthritis and employment: Making arthritis-related work changes as a means of adaptation. Arthritis Rheum 2004;51:909-16.
29. Verstappen SM, Boonen A, Bijlsma JW, et al. Working status among Dutch patients with rheumatoid arthritis: work disability and working conditions. Rheumatology Oxford 2005;44:202-6.
30. Allaire SH, Li W, LaValley MP. Reduction of job loss in persons with rheumatic diseases receiving vocational rehabilitation: a randomized controlled trial. Arthritis Rheum 2003;48:3212-8.
31. de Croon EM, Sluiter JK, Nijssen TF, et al. Work ability of Dutch employees with rheumatoid arthritis. Scand J Rheumatol 2005;34:277-83.
32. Reisine S, Fifield J, Walsh SJ, Feinn R. Factors associated with continued employment among patients with rheumatoid arthritis: a survival model. J Rheumatol 2001;28:2400–8.
33. Wolfe F. A reappraisal of HAQ disability in rheumatoid arthritis. Arthritis Rheum 2000;43:2751-61.
34. Allaire SH, Anderson JJ, Meenan RF. Reducing work disability associated with rheumatoid arthritis: Identification of additional risk factors and persons likely to benefit from intervention. Arthritis Care Res 1996;9:349-57.
35. Chorus AMJ, Miedema HS, Wevers CWJ, van der Linden S. Work factors and behavioural coping in relation to withdrawal from the labour force in patients with rheumatoid arthritis. Ann Rheum Dis 2001;60:1025–32.
36. De Roos AJ, Callahan LF. Differences by sex in correlates of work status in rheumatoid arthritis patients. Arthritis Care Res 1999;12:381-91.
37. Lundberg U, Mårdberg B, Frankenhaeuser M. The total workload of male and female white collar workers as related to age, occupational level, and number of children. Scand J Psychol 1994;35:315-27.