EXTENDED REPORT

Capability for daily activities in old people with rheumatoid arthritis: a population based study

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Ann Rheum Dis 2005;64:56–58. doi: 10.1136/ard.2003.017889

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Accepted 21 March 2004

Objective: To describe the functional capacity for daily activities in old people with clinical rheumatoid arthritis (including juvenile rheumatoid arthritis (JRA)) in a population based cohort.

Methods: A cohort of 700 people was randomly collected from the population older than 75 years in a Finnish town. Altogether 601 persons (86%) participated. Data were collected from clinical records and by interview, clinical examination, and questionnaire. Ability to carry out activities of daily living (ADL) was assessed by the Barthel index, and the IADL (instrumental activities of daily living) by the Lawton and Brody questionnaire.

Results: 16 people had clinical rheumatoid arthritis (one with JRA). The prevalence was 16/601 (2.7% (95% confidence interval, 1.7% to 4.5%)). Eight patients with rheumatoid arthritis (50%) obtained the best possible ADL figures, while three (19%) had very poor results. Seven (44%) could not dress themselves without help. Three (19%) were unable to walk, and five (31%) could not climb stairs. Sex and age adjusted results showed no statistical difference (ADL and IADL) between patients with clinical rheumatoid arthritis and rest of the cohort. Four patients (25%) had dementia, which was associated with the poor functional capacity.

Conclusions: The prevalence of the disease was unexceptional. The ability of old people with rheumatoid arthritis to carry out activities of daily living did not differ from the general population, but the disease may lead to severe disability on an individual level, especially when associated with dementia. It therefore remains a considerable challenge to the health care and social systems.

The proportion of old people in the population is rapidly increasing in all Western societies. Arthritis in general is one of the most important causes of disability in elderly individuals in various populations,^{1–5} especially lower extremity joint impairment.^{5–6} Rheumatoid arthritis is not distinguished from osteoarthritis in the papers in question. Some population based studies have reported functional capacity levels in patients with rheumatoid arthritis of various ages, but the number of elderly cases has been small or unknown.^{7–9}

Our aim in the present study was to provide more data on the functional capacity for activities of daily living in people with rheumatoid arthritis in an elderly population based cohort. These results may assist in evaluating the resources needed to help and treat these people and add to our knowledge of the disablement process in rheumatoid arthritis.¹⁰

METHODS

This undertaking forms part of the Kuopio 75+ study described previously.^{11–12} It comprises a population based health survey focused on the clinical epidemiology of diseases, medicines used, and functional capacity in people aged 75 years or more. A random sample of 700 subjects was drawn from the total population born before 1 January 1923 and living in the city of Kuopio, eastern Finland, on 1 January 1998 (n=4518). Kuopio has a population of 86 000 inhabitants, 5.3% of them falling in the age group studied.

A geriatrician and a trained nurse carried out a structured clinical examination and an interview to assess the physical and mental status of 601 subjects (86% of the random sample) in 1998. Ninety nine subjects could not be examined (79 refused to participate, five could not be contacted, and 15 had died before the examination). Medical records from the

municipal health centre, home nursing, local hospitals, and Kuopio University Hospital were available. Detailed analyses of the series and the methods of the study have been described elsewhere.^{11–12}

Activities of daily living (ADL) were evaluated by the Barthel index (range 0, help needed in all activities, to 100, independent in all tested activities).¹³ There are 10 items in the Barthel index, among them eating, toileting, personal hygiene, dressing, walking, and climbing stairs. More complex activities (for example, cooking, cleaning, laundry, taking medicines correctly, shopping, and using public transportation) were described by a scale of instrumental activities of daily living (IADL) (range: 0 to 8 points, 8 meaning no help needed), as introduced by Lawton and Brody.¹⁴

A history of cognitive decline was obtained by interviewing the subject and the relatives and by examining medical records. The mini-mental state examination (MMSE) was used to screen for cognitive capacity.¹⁵ The diagnosis of dementia as Alzheimer's disease, vascular dementia, or dementia caused by other general medical conditions was made according to the DSM-IV criteria of the American Psychiatric Association, and dementia with Lewy bodies was also noted.¹¹ All dementia diagnoses were subsequently evaluated by a neurogeriatrician (RS). The diagnostic procedure has been described elsewhere.¹¹

Subjects with a diagnosis of chronic rheumatoid arthritis (including one whose true diagnosis was later found to be juvenile rheumatoid arthritis (JRA)) were identified and

Abbreviations: ADL, activities of daily living; DMARD, disease modifying antirheumatic drug; DSM-IV, *Diagnostic and Statistical Manual of Mental Disorders*, 4th edition; IADL, instrumental activities of daily living; JRA, juvenile rheumatoid arthritis; MMSE, mini-mental state examination

Table 1 The capacity for daily activity among rheumatoid arthritis patients in the population based cohort of people older than 75 years, as evaluated by Barthel index, divided into three groups according to duration of disease

Barthel index*	0-9 (n = 5)	10-29 (n = 6)	30+ (n = 5)	Total (n = 16)
0-25	1	1	1	3
25-50	0	0	0	0
50-75	0	0	1	1
75-100	4	5	3†	12

*Maximum value indicates independence in all activities, scale from 0 to 100.

†Including a single patient with juvenile rheumatoid arthritis with a disease duration of 69 years.

characterised (table 1). Data on their ability to carry out activities of daily living were collected and compared with the corresponding data on participants without rheumatoid arthritis.

RESULTS

There were 16 people (15 women and one man) with rheumatoid arthritis in the cohort according to the basic data; thus the prevalence of clinical rheumatoid arthritis in the population was 16/601 (2.7%; 95% confidence interval, 1.7% to 4.5%). Their mean (SD) age was 80.0 (3.5) years, *v* 81.2 (4.6) years in the control population. The mean duration of rheumatoid arthritis was 24.4 years (range 2 to 69). The onset of the disease in one patient was in 1929, when she was only 13 years old. Her true diagnosis was thus JRA, but it was decided to include her in the series. A hip or knee arthroplasty had been done in nine of the 16 cases. Seven patients were on low dose systemic glucocorticoid treatment and five were on a disease modifying anti-rheumatic drug (DMARD).

Eight patients (50%) with clinical rheumatoid arthritis obtained the best possible results in the Barthel index, which did not differ significantly from the figure for the control population (276 persons, 40%). Two patients (12%) in the rheumatoid arthritis group were unable to move, three (19%) could not walk, and five (31%) were not able to climb stairs. Seven (44%) could not dress without help. The proportion of severely disabled persons (Barthel index ≤ 25) was 19% (three patients) among the rheumatoid cohort, as against only 4% (29 cases) in the non-rheumatoid group. When the results were adjusted (for sex and age), there was no statistical difference in figures for daily activities (either ADL or IADL) between the patients with rheumatoid arthritis and the other people in the cohort (fig 1).

Three patients with clinical rheumatoid arthritis (19%) compared with 78 (13%) in the non-rheumatoid population were long term residents in nursing homes or local hospitals. About the same proportions of elderly subjects with and without clinical rheumatoid arthritis suffered from dementia—four people (25%) in the rheumatoid arthritis group and 133 (23%) in the non-rheumatoid group. Three of four elderly patients (75%) suffering from dementia and rheumatoid arthritis lived in institutional care, compared with less than half (*n* = 57, 42%) of the demented non-rheumatoid elderly population. The three patients with rheumatoid arthritis and dementia were among the four with the worst Barthel index values (5, 15, and 60 respectively), and the IADL could not be evaluated in two of them (one of the available values was poor (1), while the other was 3). The ages of the four persons with rheumatoid arthritis and dementia were 85, 81, 80, and 77 years. Two of these had Lewy body disease, one had

Figure 1 The scores for activities of daily living (ADL) (Barthel) and instrumental activities of daily living (IADL) (Lawton and Brody) among patients with clinical rheumatoid arthritis older than 75 years and in the population based control cohort.

secondary dementia, and only one had Alzheimer's disease. The one with JRA was not demented.

We divided the clinical rheumatoid arthritis group into three subgroups according to the duration of the disease (0 to 9 years; 10 to 29 years; and more than 30 years); there were five, six, and five patients in these groups, respectively. Severe disability was strongly associated with the presence of dementia but not with the duration of rheumatoid arthritis. The patient with JRA was not disabled (table 1).

DISCUSSION

The percentage of elderly people in the population of the Western countries has increased during past decades and this progress is expected to continue. The proportion of persons aged 75 years or more in this population in 1998 was 5.3% and it will probably be 7.1% by 2020 (official statistics of the city of Kuopio, Finland). Senior citizens often suffer from chronic conditions, especially of the locomotor system.^{10 11 16-21} Population based data on the functional capacity of old people is indispensable in planning the resources needed in society to take care of them in the future. The ability to lead an independent life improves with better access to good care, but decreases dramatically for those with age related disabling conditions.¹⁹ Despite progress in the active treatment of rheumatoid arthritis, the disease is and probably will remain a prominent cause of some degree of disability in the population.^{9 19 20}

This study involved a cohort of 700 old people in a Finnish city with a homogeneous population. The results can be considered representative of the population, as the participation percentage (86%) in the cohort was high and the subjects (601 persons) were thoroughly interviewed and studied. This including evaluation of their medical records. Their functional abilities were evaluated by ADL (Barthel index) and IADL (Lawton and Brody) scales,^{13 14} which are commonly used in studies on elderly populations and also in clinical practice, although less widely in rheumatology.

The prevalence of rheumatoid arthritis in this study population was 2.5%, and that of JRA 0.16%, bringing the overall prevalence of chronic arthritis (clinical rheumatoid arthritis) up to 2.7%. These figures are acceptable when the chronic nature and the peak incidence of the disease and the

risk of premature death among affected individuals are taken into account.^{21–22} However, a slightly lower frequency (1.7%) has previously been reported in Finland.¹⁸ The prevalence of rheumatoid arthritis in Oslo is reported to be only 1.4% in the age group 70 to 79 years, but figures there were also low among younger people.⁸

The main finding here was that the mean capability for daily activities among patients with clinical rheumatoid arthritis did not differ significantly from that in the rest of the population. However, the proportion of severely disabled people (Barthel index ≤ 25 points) among patients with clinical rheumatoid arthritis was high (19%), and their distribution in Barthel index and IADL values was slightly bipartite. Severe disability seemed to be associated with the prevalence of dementia. Probably persons with rheumatic physical disabilities need institutional care at an earlier state of dementia than non-rheumatoid persons with dementia. The prevalence of dementia did not differ significantly between the population based cohorts in our study; in some other studies, however, Alzheimer's disease has been found to be less common in persons with rheumatoid arthritis.²³ This may also be the case in our sample, as a rather low proportion (25%) of the rheumatoid patients with dementia had Alzheimer's disease. The causes of dementia in the whole series (137 patients) have been reported earlier (Alzheimer's disease, 64 (47%); vascular dementia, 32 (23%); Lewy body disease, 30 (22%); and other, 10 (8%)).¹¹ The mean Barthel index and IADL score values of the all dementia patients in the series were 58 and 4, respectively.¹¹

Fried and associates have reported that specific pairs of chronic diseases are synergistically associated with different types of disability, well beyond the multiplicative effect of the two diseases independently.¹ They conclude that for disability prevention, individuals manifesting one high risk chronic disease should be carefully screened for prevention of other diseases which might interact to cause disability.¹ This may also be the case with the combination of rheumatoid arthritis and dementia. Thus the indirect costs of dementia are probably especially high in patients with rheumatoid arthritis (and other physically disabling conditions) and vice versa, and this should be taken into account when the total costs of active treatment of rheumatoid arthritis and dementia are assessed. The long term cost-effectiveness of expensive biological anti-rheumatic treatments for old people should be evaluated in the future.

The lack of significant difference in mean functional capacity among rheumatoid patients and the general population was surprising, but probably reflects active and effective treatment of rheumatoid arthritis patients in developed countries (including DMARDs, glucocorticoids, rehabilitation, and arthroplasty).²⁰ Patients with the most severe rheumatoid arthritis had probably died before they could have entered our cohort. In a 25 year prospective study of rheumatoid arthritis, Reilly and colleagues found that a better long term prognosis was associated with milder disease and better functional capacity.²⁴ Improving treatment of rheumatoid arthritis will probably lengthen the life expectancy of affected patients, increasing their numbers in the future. Maintaining their mobility in later life is important, because mobility difficulties have been found to predict further disability, loss of independence, and even death.^{5–6}

Conclusions

It was encouraging to find that, in terms of activities of daily living, the functional capacity of old people with clinical rheumatoid arthritis did not differ significantly from that of the non-rheumatoid population. Unfortunately rheumatoid arthritis may lead to severe and even total disability at an

individual level, especially when associated with dementia, and will thus remain a great challenge to the health care and social systems.

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REFERENCES

1. Fried LP, Bandeen-Roche K, Kasper JD, Guralnik JM. Association of comorbidity with disability in older women: the Women's Health and Aging Study. *J Clin Epidemiol* 1999;**52**:27–37.
2. Raina P, Dukeshire S, Lindsay J, Chambers LW. Chronic conditions and disabilities among seniors: an analysis of population-based health and activity limitation surveys. *Ann Epidemiol* 1998;**8**:402–9.
3. Markides KS, Stroup-Benham CA, Goodwin JS, Perkowski LC, Lichtenstein M, Ray LA. The effect of medical conditions on the functional limitations of Mexican-American elderly. *Ann Epidemiol* 1996;**6**:386–91.
4. Woo J, Ho SC, Yu LM, Lau J, Yuen YK. Impact of chronic diseases on functional limitations in elderly Chinese aged 70 years and over: a cross-sectional and longitudinal survey. *J Gerontol A Biol Sci Med Sci* 1998;**53**:M102–6.
5. Hirvensalo M, Rantanen T, Heikkinen E. Mobility difficulties and physical activity as predictors of mortality and loss of independence in the community-living older population. *J Am Geriatr Soc* 2000;**48**:493–8.
6. Hughes SL, Dunlop D, Edelman P, Chang RW, Singer RH. Impact of joint impairment on longitudinal disability in elderly persons. *J Gerontol* 1994;**49**:S291–300.
7. van Schaardenburg D, van den Brande KJ, Ligthart GJ, Breedveld FC, Hazes JM. Musculoskeletal disorders and disability in persons aged 85 and over: a community survey. *Ann Rheum Dis* 1994;**53**:807–11.
8. Kvien TK, Glennäs A, Knudsrød OG, Smedstad LM, Mowinckel P, Førre O. The prevalence and severity of rheumatoid arthritis in Oslo: results from a county register and a population survey. *Scand J Rheumatol* 1997;**26**:412–18.
9. Sokka T, Krishnan E, Häkkinen A, Hannonen P. Functional disability in rheumatoid arthritis patients compared with a community population in Finland. *Arthritis Rheum* 2003;**48**:59–63.
10. Badley EM, Tennant A. Impact of disability due to rheumatic disorders in a British population: estimates of severity and prevalence from the Calderdale Rheumatic Disablement Survey. *Ann Rheum Dis* 1993;**52**:6–13.
11. Rahkonen T, Eloniemi-Sulkava U, Rissanen S, Vatanen A, Viramo P, Sulkava R. Dementia with Lewy bodies according to the consensus criteria in a general population aged 75 years or older. *J Neural Neurosurg Psychiatry* 2003;**74**:720–4.
12. Hartikainen S, Rahkonen T, Kautiainen H, Sulkava R. Does advanced age predict more common use of psychotropics among the elderly? – Kuopio 75 + study. *Int Clin Psychopharmacol* 2003;**18**:163–7.
13. Mahoney FI, Barthel D. Functional evaluation: the Barthel Index. *Md Med J* 1965;**14**:61–5.
14. Lawton MP, Brody EM. Assessment of older people. Self-maintaining and instrumental activities of daily living. *Gerontologist* 1969;**9**:179–86.
15. Folstein MF, Folstein SE, McHugh PR. "Mini-mental state". A practical method for grading the cognitive state of patients for the clinician. *J Psychiatr Res* 1975;**12**:129–98.
16. McGann PE. Geriatric assessment for the rheumatologist. *Geriatric Rheumatol* 2000;**26**:415–32.
17. Badley EM, Tennant A. Changing profile of joint disorders with age: findings from a postal survey of the population of Calderdale, West Yorkshire, United Kingdom. *Ann Rheum Dis* 1992;**51**:366–71.
18. Laiho K, Tuomilehto J, Tilvis R. Prevalence of rheumatoid arthritis and musculoskeletal diseases in the elderly population. *Rheumatol Int* 2001;**20**:85–7.
19. Cassel CK. Geriatrics for the third millennium. *Wien Klin Wochenschr* 2000;**112**:386–93.
20. Hakala M, Nieminen P. Functional status assessment of physical impairment in a community based population with rheumatoid arthritis: severe incapacitated patients are rare. *J Rheumatol* 1996;**23**:617–23.
21. Kaipainen-Seppänen O, Aho K, Isomäki H, Laakso M. Shift in the incidence of rheumatoid arthritis towards elderly patients in Finland during 1975–1990. *Clin Exp Rheumatol* 1996;**14**:537–42.
22. Myllykangas-Luosujärvi R, Aho K, Kautiainen H, Isomäki H. Shortening of life span and causes of excess mortality in a population-based series of subjects with rheumatoid arthritis. *Clin Exp Rheumatol* 1995;**13**:149–53.
23. Myllykangas-Luosujärvi R, Isomäki H, Altzheimer's disease and rheumatoid arthritis. *Br J Rheumatol* 1994;**33**:501–2.
24. Reilly PA, Cosh JA, Maddison PJ, Rasker JJ, Silman AJ. Mortality and survival in rheumatoid arthritis: a 25 year prospective study of 100 patients. *Ann Rheum Dis* 1990;**49**:363–9.