

Concise report

Functional disability in patients with rheumatoid arthritis admitted for multidisciplinary rehabilitation from 1992 to 2009

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Abstract

Objective. Advances in pharmacological care for RA have in general reduced functional disability. However, subgroups of patients may need treatment by a multidisciplinary team. This study aimed to describe the levels of functional ability and outcomes of patients with RA admitted for multidisciplinary rehabilitation in the past 20 years.

Methods. Data from three observational studies including four cohorts (1, 1992; 2a, 2001; 2b, 2003 and 3, 2008) on outcomes of multidisciplinary rehabilitation for RA patients conducted in one Dutch rheumatology clinic were used. Baseline and change scores of the HAQ were compared using a one-way analysis of variance with post hoc multiple comparisons (Bonferroni correction).

Results. The mean HAQ scores were 1.94 (s.d. 0.74) for cohort 1, 1.40 (0.74) and 1.39 (0.66) for cohorts 2a and 2b, respectively, and 1.49 (0.59) for cohort 3, with the difference between cohort 1 on the one side and cohorts 2a/2b and 3 on the other side being statistically significant ($P < 0.01$). The mean changes in HAQ score between admission and discharge were 0.24 (s.d. 0.50) for cohort 1, 0.17 (0.49) for cohort 2a, 0.15 (0.37) for cohort 2b and 0.25 (0.46) for cohort 3.

Conclusion. The level of functional disability of RA patients admitted for multidisciplinary rehabilitation decreased between 1992 and 2001. The magnitude of improvement in functional ability during admission was in the same range in all three periods. These results suggest that in the era of MTX and biologics there are patients with RA who have considerable disability and benefit from multidisciplinary rehabilitation.

Key words: rheumatoid arthritis, patient care team, rehabilitation, outcome assessment, disability evaluation, patient-centred care.

Introduction

In patients with RA who have persistent or progressive disability, care provided by a team of professionals is

recommended [1, 2]. Formal multidisciplinary rehabilitation programmes include the involvement of health care providers with different professional backgrounds and the patient. These programmes can be provided in an inpatient, outpatient or day patient care setting. In a number of studies the benefits of multidisciplinary rehabilitation have been described [3–7].

Advances in pharmacological care for RA in the past decades have reduced its consequences in terms of disease activity, radiological damage and functional disability [8–12]. This raises the question whether and/or to what extent the characteristics of patients admitted for multidisciplinary rehabilitation as well as the benefits of the intervention have changed over time.

This study aims to describe baseline functional disability levels and treatment outcomes in patients with RA who were admitted for multidisciplinary rehabilitation over two

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Submitted 9 January 2013; revised version accepted 10 May 2013.

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decades using the data of three observational studies. The periods during which these studies were conducted correspond with the MTX era (1991–2000) and the biologic era (after 2000) [12].

Patients and methods

Study designs and patient selection

For this study the data from three observational studies (comprising four cohorts) on the outcomes of multidisciplinary rehabilitation for patients with a diagnosis of RA according to the 1987 ARA criteria [13] conducted in the rheumatology clinic Sole Mio at the Leiden University Medical Center (LUMC) were used.

The first study was judged to be non-medical research according to the Medical Research Involving Human Subjects Act by the Medical Ethics Review Committee of the LUMC since assessments were done in concordance with usual care. In line with this decision, individual informed consent was not obtained (the participants were free to either participate or not). For the other two studies approval from the medical ethics committee of the LUMC was obtained and all patients gave written informed consent. No additional ethical approval was requested for the current comparison since all separate studies were judged by the Medical Ethics Review Committee. Only anonymous datasets were used in the current comparison.

The first study was a prospective observational study conducted between March 1992 and June 1993 [14]. This study aimed to describe the clinical course of RA patients admitted for inpatient multidisciplinary rehabilitation. All consecutive RA patients who were admitted for a disease flare not responding to outpatient management were included. Patients with RA who were admitted for rehabilitation after orthopaedic surgery were excluded.

The second study was a prospective pre-test/post-test study including two cohorts: cohort 2a from January 2001 to December 2001 and cohort 2b from January 2003 to December 2003 [15]. This study aimed to determine the impact of the introduction of a rehabilitation tool on the effectiveness on multidisciplinary rehabilitation provided in an inpatient and day patient care setting. This study included consecutive RA patients >18 years of age who had sufficient physical and emotional health status to take part in assessments and complete questionnaires (judged by the treating rheumatologist). Exclusion criteria were admission after total joint replacement surgery or for medical complications of RA.

The third study was an observational study conducted between June 2008 and July 2009. This study was part of an international multicentre study that aimed to describe a common framework for rehabilitation in terms of the structure, process and outcome of the rehabilitation care process [16]. In this study consecutive adult RA patients who were admitted for day patient multidisciplinary rehabilitation were included. The exclusion criterion was not being able to understand Dutch.

Two randomized controlled trials including RA patients and conducted in the same clinic by Tjhuis *et al.* [17] and Vliet Vlieland *et al.* [3] were omitted because these did not include consecutive patients but included patients based on specific criteria regarding disease activity or functional decline. These studies were therefore likely to introduce selection bias in the current comparison.

Multidisciplinary rehabilitation

The multidisciplinary rehabilitation programme was delivered at the inpatient (cohorts 1 and 2) and day patient (cohorts 2 and 3) wards of the Rheumatology Rehabilitation Clinic of the LUMC. This clinic is the only setting in the region delivering both inpatient and day patient rehabilitation specifically for patients with rheumatic diseases. The patients in the inpatient ward received multidisciplinary rehabilitation from Monday to Friday during their admission. The patients in the day patient ward received multidisciplinary rehabilitation on 2–3 days/week in consecutive weeks. Both with inpatient and day patient rehabilitation, the duration depended on individual needs and goals.

The multidisciplinary team comprised a rheumatologist, an occupational therapist, a physical therapist, a social worker and a clinical nurse specialist. For every patient, individual treatment goals were set and discussed during weekly multidisciplinary team conferences. The programme consisted of individual treatments by the rheumatologist and health professionals depending on the patients' individual needs. In addition, most patients participated in supervised, standardized group exercise sessions (hydrotherapy and land-based aerobic and muscle-strengthening training).

Assessments

In all three studies clinical assessments were performed and questionnaires were administered at admission and discharge from the rehabilitation clinic, among other time points.

Sociodemographic, disease and rehabilitation characteristics

At baseline, age, gender, disease duration, RF, presence of erosions, current medication, status of living (i.e. living alone), education level (low: up to and including lower technical and vocational training; medium: up to and including secondary technical and vocational training; and high: up to and including higher technical and vocational training and university) and employment status (i.e. having paid work) were collected.

Primary outcome

Primary outcomes for the present analysis were the baseline score and the change score between admission and discharge of the HAQ. The HAQ measures functional ability and comprises 20 questions regarding eight domains of activities of daily living with the total score ranging from 0 (no functional limitations) to 3 (serious functional limitations) [18].

Data and data analysis

Corresponding data from the three studies (variables registered in all three studies) were collected into a single database for data analysis. Raw data for age, disease duration and length of rehabilitation were only available from studies 2a, 2b and 3. Descriptive statistics were used for the baseline data and mean (s.d.) or median (minimum – maximum) was calculated where appropriate.

Continuous baseline variables including HAQ scores at admission, discharge and the change scores were compared among the cohorts by means of a one-way analysis of variance (ANOVA) with post hoc multiple comparisons using Bonferroni correction. Within the cohorts the HAQ scores between admission and discharge were compared using the paired samples *t*-test. All dichotomous variables were compared among the cohorts by means of the Kruskal–Wallis test.

All statistical analyses were performed using the Statistical Package for the Social Sciences (IBM SPSS Statistics 20.0 for Windows, <http://www-01.ibm.com/software/analytics/spss/>) with $P < 0.05$ considered to be statistically significant. Tests were all two-sided.

Results

Baseline sociodemographic and clinical characteristics

The baseline characteristics of the patients in the four cohorts are presented in Table 1. Patients in the different

cohorts had a similar average age and disease duration, with the majority being female. With time, the proportion of patients with erosive disease decreased. Over time there was a shift from inpatient to day patient care and a decrease in the number of rehabilitation days. The use of DMARDs remained stable, whereas biologics were only used in study 3 from 2008. The proportions of patients using NSAIDs and corticosteroids at admission increased, in particular between 1992 and 2001.

Admission HAQ scores

There was a statistically significant ($P < 0.001$) difference between the baseline HAQ score in cohort 1 [1.94 (s.d. 0.74)] and the baseline HAQ scores in cohorts 2a, 2b and 3 [1.40 (s.d. 0.74), 1.39 (s.d. 0.66) and 1.49 (s.d. 0.59), respectively]. All other comparisons among cohorts 2a, 2b and 3 did not reach statistical significance.

Discharge HAQ scores

The HAQ score at discharge was significantly higher in cohort 1 [1.71 (s.d. 0.78)] than in cohorts 2a, 2b and 3 [1.22 (s.d. 0.79), 1.22 (s.d. 0.62) and 1.27 (s.d. 0.69), respectively]. The comparisons of discharge HAQ scores among cohorts 2a, 2b and 3 were not statistically significant.

Changes in HAQ scores

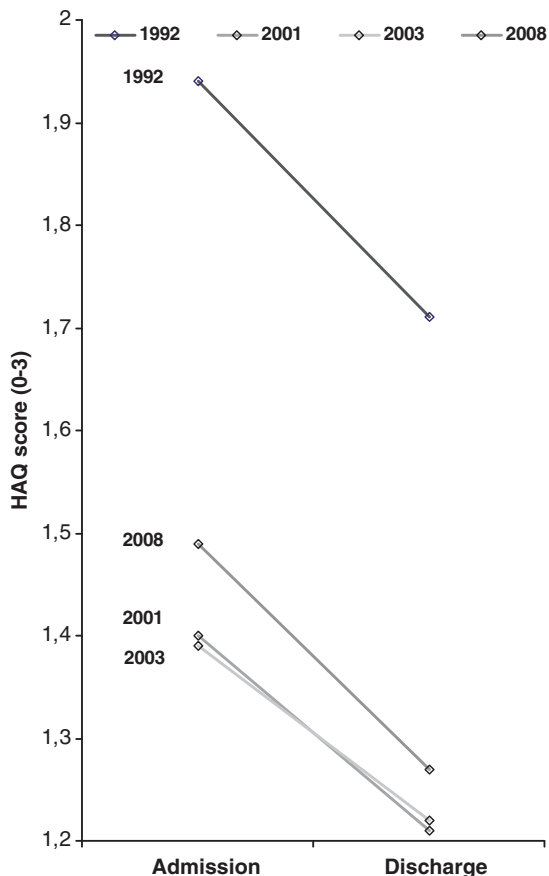
Table 1 shows that in all four cohorts the difference in HAQ score between admission and discharge was

TABLE 1 Sociodemographic and disease characteristics of RA patients admitted for multidisciplinary rehabilitation from 1992 to 2009

Study Year	1 1992–1993	2a 2001	2b 2003	3 2008–2009	<i>P</i> -value
Number of patients					
Inpatient	63	28	29	0	
Day care	0	52	56	49	
Total	63	80	85	49	
Age, mean (s.d.), years ^a	62 (15.7)	60 (15.3)	60 (14.9)	58 (13.7)	0.56
Disease duration, mean (s.d.), years ^a	11.3 (11.7)	11.2 (11.4)	9.3 (9.9)	8.3 (10.5)	0.27
Rehabilitation days, mean (s.d.) ^a	47	11 (11.2)	9 (9.8)	9 (2.8)	0.24
Females, <i>n</i> (%) ^b	47 (75)	49 (61)	65 (77)	34 (69)	0.15
RF, <i>n</i> (%) ^b	56 (89)	57 (71)	58 (73)	36 (74)	0.06
Erosions present, <i>n</i> (%) ^b	55 (87)	59 (74)	49 (61)	31 (63)	0.00***
Paid work, <i>n</i> (%) ^b	n/a	18 (23)	17 (20)	14 (29)	0.52
Use of medication, <i>n</i> (%)					
NSAIDs ^b	19 (30)	59 (74)	49 (61)	31 (63) ^c	0.00***
DMARDs ^b	42 (67)	58 (73)	69 (81)	35 (71)	0.24
Prednisone ^b	6 (10)	24 (30)	21 (25)	15 (31)	0.02***
Biologics	—	—	—	15 (31)	—
HAQ admission (0–3), mean (s.d.) ^d	1.94 (0.74)	1.40 (0.74)*	1.39 (0.66)*	1.49 (0.59)*	0.00***
HAQ discharge (0–3), mean (s.d.) ^d	1.71 (0.78)	1.21 (0.62)*	1.22 (0.62)*	1.27 (0.69)*	0.00***
HAQ change scores ^d	0.21 (0.50)**	0.17 (0.49)**	0.15 (0.37)**	0.25 (0.46)**	0.69

^aOne-way ANOVA with post hoc Bonferroni correction between studies 2a, 2b, and 3. ^bKruskal–Wallis test between studies 1, 2a, 2b, and 3. ^cIncluding paracetamol. ^dOne-way ANOVA with post hoc Bonferroni correction between studies 1, 2a, 2b and 3. *Significant difference ($P < 0.05$) with study 1, one-way ANOVA after post hoc Bonferroni. **Significant change ($P < 0.05$) in HAQ score within the study; *t*-test for paired samples. ***Statistically significant difference ($P < 0.05$) between the studies 1, 2a, 2b and 3.

Fig. 1 HAQ scores between admission and discharge in four cohorts on multidisciplinary rehabilitation for RA patients.



statistically significant (cohort 1, $P=0.004$; cohort 2a, $P=0.005$; cohort 2b, $P=0.001$; cohort 3, $P=0.001$). None of the differences between the mean change scores among the four cohorts reached statistical significance ($P=0.69$). The decrease in mean HAQ scores during admission within the four different cohorts is illustrated in Fig. 1.

Discussion

This study comparing the levels of functional disability of RA patients admitted for multidisciplinary team treatment in one centre in the Netherlands shows that HAQ scores decreased substantially and significantly between 1993 and 2001 but not thereafter, whereas the absolute improvements of the HAQ scores between admission and discharge remained constant. The decrease in HAQ score at admission of RA patients between 1992 and 2001–2003 who are eligible for multidisciplinary rehabilitation is in agreement with the literature showing a decrease over time of disability in comparable cohorts of RA patients [11, 12].

It was expected that disability in terms of HAQ would continue to decrease between 2003 and 2008 [12]. However, this was not observed and can possibly be explained by the fact that the patients admitted for multidisciplinary rehabilitation are a subgroup of patients who are experiencing higher levels of disability rather than the general RA population. The persisting presence of these patients underpins the observation that despite recent pharmacological improvements and their effectiveness in targeting disease activity, a considerable proportion of patients do not achieve complete remission [19]. Although the present study makes it clear that there is still a group of RA patients with considerable disability, the design of the present study does not allow for an estimation of their absolute number. However, the number of patients per year included in the cohorts employing similar inclusion criteria does not point towards a decline.

Despite the decreased HAQ scores at admission, the magnitude of the improvement of the HAQ was stable over time. In the literature a clinically relevant improvement of physical functioning is in agreement with an improvement of the HAQ score of 0.21 [20]. The change in the HAQ score seen in the three studies included in the present analysis was close to this improvement. As the lower baseline HAQ scores in the later studies leave less room for improvement than the HAQ score of the oldest study, the relative improvement in later years may be interpreted as larger than that in earlier studies.

Moreover, it shows that rehabilitation is effective in achieving its aims, i.e. in improving functioning. Therefore multidisciplinary rehabilitation should always be considered for patients with RA who experience problems in multiple important life domains. The HAQ remains an important and reliable instrument for detecting changes in RA patients who receive rehabilitation.

Limitations

This study has a number of limitations, including the fact that the three studies were all conducted in one centre in the Netherlands, hampering its generalizability. However, this could also be considered a strength because of the uniformity of the rehabilitation clinic and the indication setting for the included patients over the years.

Although it is likely that the functional disability of RA patients has decreased since the introduction of more effective pharmacological therapy, the decrease in the baseline HAQ score with time does not exclude the possibility that the spectrum of problems that RA patients encounter in daily life has shifted. It remains to be established whether the overall burden of the disease has decreased. First, the validity of some HAQ items, such as the use of taps, is debatable. Second, the HAQ score mainly comprises items regarding daily activities, in particular self-care, whereas activities related to employment or sports and leisure activities are underrepresented.

In conclusion, the present study shows that the functional ability of RA patients admitted for multidisciplinary rehabilitation decreased between 1992 and 2001, but not between 2001 and 2008, whereas the absolute magnitude

of improvement remained the same. These results underline the value of multidisciplinary rehabilitation for selected groups of RA patients.

Rheumatology key messages

- The functional disability of RA patients admitted for multidisciplinary rehabilitation decreased between 1992 and 2001 in the Netherlands.
- Improvement in RA patients' functional disability after rehabilitation remained constant between 1992 and 2009 in the Netherlands.
- Even in the biologics era, RA patients with considerable disability benefit from multidisciplinary rehabilitation in the Netherlands.

Acknowledgements

The authors thank all participating patients and health professionals for their contribution.

Disclosure statement: The authors have declared no conflicts of interest.

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