ORIGINAL ARTICLE

EXPLORING THE RELATIONSHIP BETWEEN IMPAIRMENT AND DISABILITY IN INDIVIDUALS WITH RHEUMATOID ARTHRITIS

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Abstract

Objective: *The aim of this study is to analyze the relationship between impairment and disability in individuals with Rheumatoid Arthritis.*

Methods: *One hundred individuals with Rheumatoid Arthritis (86 women, 14 men; mean age=49.93±11.38 years; range: 20 to 65 years) were included in the study. Impairment was evaluated by use of Disease Activity Score 28 (DAS28). Disability was assessed by Disabilities of Arm, Shoulder and Hand Questionnaire (DASH), Michigan Hand Outcomes Questionnaire (MHQS) and Duruoz Hand Index (DHI). The presence of relationship between impairment and these disability scales was evaluated by Spearman correlation analysis.* ***Results:*** *DAS28 score was moderately and highly correlated with DASH, MHQS-total and other subscales and DHI scores (DASH; r=0.655, MHQS-total and other subscales; r=-0.708 to r=-0.570, DHI r=0.619) while DAS28 score was poorly correlated with MHQS-aesthetics subscale score (r=-0.323).*

Conclusion: *In our study, it was concluded that impairment was an important indicator of disability by determined upper extremity scales in individuals with Rheumatoid Arthritis. Since upper extremity involvement is widespread in individuals with Rheumatoid Arthritis, upper extremity disability scales could use to determine disability.*

Key words: *Arthritis, Rheumatoid, Disability evaluation, Self care*

Introduction

Rheumatoid arthritis (RA) is a systemic, chronic and progressive inflammatory disease (1). RA is the most common chronic and inflammatory polyarthritis in adults, affecting approximately 1% of the global adult population (2,3). The prevalence of RA in Turkey, according to a study held in 2006 is 0.36% (4).

RA can affect all joints symmetrically, whether large or small. Small joint involvement such as finger and wrist joints is more common and hand-wrist involvement is seen in 80-90% of RA patients (5). Impairments such as inflammation, deformity, joint swelling, and pain in the hand and wrists are common in RA and cause limitation of movement (6). Severe dysfunction can also cause functional problems and even impact on the return to work. These limitations are considered as disability (7).

The relationship between impairment and disability is both complex and difficult (8). In previous studies, there is no clear consensus on the relationship between impairment and disability in RA. The reason for different results regarding this relationship could be the factors of how the disability is assessed and how the individual defines the disability (9). How impairment affects disability depends on the individual, so is more subjective. Disability levels reported by two people with the same level of impairment could be quite different (10). From this point of view, differences in social perceptions may also have led to inconsistencies in these results. To the best of our knowledge, the study by Koybasi et al. is the only one to have investigated the relationship between impairment and disability in individuals with RA in a Turkish population (11).

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The relationship between impairment and disability can play a key role in planning treatment. For example, while treatment of a low level of disability focuses primarily on hand therapy interventions, cognitive behavioral therapy is the basis of treatment for higher levels of disability (12). In order for the relationship between impairment and disability to be known in the best possible way, both must be assessed in a proper manner. The Health Assessment Questionnaire (HAQ) has been widely used in studies that have examined the relationship between impairment and disability in individuals with RA (13). HAQ was also used in the only study that examined the relationship between impairment and disability in individuals with RA who represented a segment of Turkish society (11). A high degree of hand-wrist involvement can be considered an important factor that leads to disability in RA individuals. Therefore, in this study it was aimed to create a broader perspective by assessing the level of disability in RA individuals with three different scales that evaluate the upper extremities. The aim of this study was to investigate the relationship between impairment as determined with the Disease Activity Score 28 (DAS28) and disability levels using different scales associated with the upper extremity.

Methods

Participants

The study included 100 participants diagnosed with RA by a rheumatologist according to the 2010 classification criteria of the American Association of Rheumatology / European League Against Rheumatism. Inclusion criteria were (a) RA diagnosis, (b) age of 18-65 years, (c) no other diseases at a level affecting functions (orthopedic, neurological, cardiovascular or metabolic disease). Exclusion criteria were (a) the presence of a comorbidity that may affect upper extremity and hand functions (carpal tunnel syndrome, trigger finger, impingement syndrome, thoracic outlet syndrome, lateral and medial epicondylitis, hand osteoarthritis), (b) cognitive impairment, (c) pregnancy, (d) illiteracy.
This study had been approved by the local ethics committee and was performed in accordance with the Declaration of Helsinki. All patients gave their informed consent prior to their inclusion in the study.

Measures
Impairment was evaluated using DAS28. The level of disability was assessed using the Disabilities of Arm, Shoulder and Hand Questionnaire (DASH), the Michigan Hand Outcomes Questionnaire (MHQS), and the Duruoz Hand Index (DHI).
The DAS28 evaluations of all the patients were performed by a single experienced rheumatologist. The data were collected on the same day by a single physiotherapist experienced in rheumatological rehabilitation.
Disease Activity Score 28 (DAS28)
This index, which indicates the current state of the patient, assesses a total of 28 swollen and sensitive joints, the patient's overall health status and erythrocyte sedimentation rate. A high score indicates high disease activity (>5.1 high disease activity, 3.2 < DAS28 ≤5.1 moderate disease activity, ≤3.2 low disease activity, <2.6 remission) (14).

Disabilities of Arm, Shoulder and Hand Questionnaire (DASH)
DASH consists of 30 items related to symptoms and activities of daily living which are scored between 1-5 (1:no difficulty, 5:unable) (15). Adaptation of the questionnaire to Turkish culture was made by Düger et al. (16).

Michigan Hand Outcomes Questionnaire (MHQS)
MHQS consists of 63 questions and 6 subscales (general hand function, daily life activities, work performance, pain, aesthetics and patient satisfaction) evaluating both hands (17). A high score shows high satisfaction. Turkish validity and reliability studies have been conducted (18).

Duruoz Hand Index (DHI).
DHI consists of 18 questions scored between 0 (without difficulty) and 5 (impossible). A high score represents greater disability and more difficulty (19).

Statistical Analysis

As a result of the power analysis, it was calculated that at least 100 participants could achieve 80% power with 95% confidence. The data were analyzed using SPSS 21 statistical software. Conformity of continuous variables to normal distribution was assessed using the Kolmogorov-Smirnov test. Normally distributed continuous variables were expressed as mean ± standard deviation (SD), and continuous variables not showing normal distribution were expressed as median (minimum-maximum) values. Categorical variables were expressed as numbers (n) and percentages (%). The relationships between impairment and disability scales were assessed using Pearson Correlation Analysis (normal distribution) or Spearman Correlation Analysis (non-normal distribution). Correlation was classified as low (r=0.10-0.49), moderate (r=0.50-0.69) or high (r=0.70-1.00) (20).

Results

Evaluation was made of 100 participants with RA, comprising 84 females and 14 males with a mean age of 49.93±11.38 years. The mean duration of disease was 8.29±7.30 years (min=4 months, max=30 years). The demographic characteristics of the patients are shown in Table 1. The DAS28 scores and disability scale scores are presented in Table 2.
When the relationship between DAS28 and the disability scales was examined, DAS28 was seen to be highly correlated with the MHQS-total score (r=-0.708, p<0.001) and moderately correlated with DASH-total (r=0.655, p=0.000), MHQS-general hand function subscale (r:=-0.595, p<0.001), MHQS-daily life activities subscale (r:=-0.670, p<0.001),MHQS-work performance subscale(r=-0.570,

p<0.001), MHQS-pain subscale (r=-0.609, p<0.001), MHQS-patient satisfaction subscale (r=-0.596, p<0.001) and DHI-total (r=0.619, p<0.001) scores. The DAS28 was poorly correlated with the MHQS-aesthetics subscale score (r=-0.323, p=0.001) (Table 3).

Table1. Demographic characteristics

	Median (min – max)
Age (years)	52.00 (20.00-65.00)
Height (cm)	160.00 (134.00-178.00)
Body weight (kg)	70.50 (45.00-170.00)
Body mass index (kg/m^2)	27.44 (17.76-58.82)
Disease duration (years)	6.00 (0.04-30.00)
	n (%)
Gender	
Female	86.00 (86.00)
Male	14.00 (14.00)
Job	
Housewife	66.00 (66.00)
Working	18.00 (18.00)
Student	4.00 (4.00)
Retired	12.00 (12.00)

Table 2. DAS28 scores and disability scales scores

	Median (min-max)
DAS28	2.75 (0.96-5.93)
DASH-total	33.04 (0.00-90.83)
MHQS-general hand function	65.00 (25.00-100.00)
MHQS-daily life activities	77.58 (6.25-100)
MHQS-work performance	55.00 (0.00-100.00)
MHQS-pain	50.00 (10.00-100.00)
MHQS-aesthetics	100.00 (0.00-100.00)
MHQS-patient satisfaction	64.58 (22.00-100.00)
MHQS-total	65.83 (16.74-100.00)
DHI-total	12.50 (0.00-90.00)

DAS28: Disease Activity Score 28; DASH: Disabilities of Arm, Shoulder and Hand Questionnaire; DHI: Duruoz Hand Index; MHQS: Michigan Hand Outcomes Questionnaire

Discussion

The aim of this study was to investigate the relationship between impairment and disability as determined in three different upper extremity scales in individuals with RA. The results showed a moderate to high correlation between impairment and disability in individuals with RA.

In RA patients, the ability of hand manipulation is influenced by factors such as anatomical integrity, range of motion, muscle strength, sense and coordination. This influence is one of the most important causes of the disability (21). It has been argued that the use of valid and reliable scales to assess the impact of hand problems on functionality and quality of life is necessary in assessing the effectiveness of treatment, monitoring the course of the disease, and making clinical decisions (22-24).

The relationship between impairment and disability is a matter of debate in literature. In parallel with the current study results, Hakkinen et al emphasized the relationship between impairment and disability (21), Sokka et al and Welsing et al stated that impairment is an important indicator of disability in all periods of RA (25,26), Wiles et al, Uhlig et al and Combe et al also concluded that impairment is the most consistent determinant of disability both in the early period and in the later stages of RA (27-29), and Boyd et al reported a correlation between functional capacity (disability) and impairment (30).

In contrast, Hörnberg et al and Mian et al found that even if the impairment decreased, the disability remained unchanged and they concluded that controlling synovitis did not result in a reduction in disability and they concluded that controlling synovitis did not cause disability and therefore it was insufficient to focus solely on synovitis suppression in the treatment (31,32). Lindqvist et al and Diffin et al reported that the level of disability increased while impairment decreased (33,34).

In a study by Aletaha et al, it was suggested that the low correlation between disability and impairment in participants may be due to other factors other than disease activity and that comorbidities may cause problems in functional capacity (35).

These contradictory results in the literature prevent clarification of the relationship between impairment and disability and do not meet the requirements that will guide multi-disciplinary interventions to prevent the progress of disability (8).

Strand et al reported a high correlation between physical disability and loss of social and economic opportunities in participants with RA. In the current study, there was a moderate and high correlation between impairment and disability scales and it was concluded that impairment is an important indicator of disability (36). It can be considered that treatment options which intervene in joint damage and

inflammation will provide greater social and individual benefits by reducing the disease activity of patients with RA. Since disease activity can be changed to consistent, meaningful and independent variables, it can contribute to both individual and societal dimensions when the disease activity is regulated and the effects of the disease activity on the disability are controlled to maintain good functional capacity during disease progression in RA (37).

In the vast majority of previous studies in literature, general disability scales, especially the HAQ, have been widely used to assess disability. In the current study, using scales of disability associated with the upper extremity in individuals with RA, impairment was found to have high and moderate correlations with disability. Therefore, the use of the disability scales associated with the upper extremity can be considered to be more sensitive in the detection of disability in RA.

Limitations of the Study

The human being is a biopsychosocial entity. Impairment provides a biological evaluation of individuals with RA and disability scales evaluate the individual's psychosocial status. A limitation of the study could be said to be that there was no analysis of psychosocial factors, such as psychological, socio-economic, personal and environmental factors, which cause disability.

Conclusion

From the results of this study using upper extremity scales in individuals with RA, it was concluded that impairment was an important indicator of disability. Since upper extremity involvement is widespread in patients with RA, upper extremity disability scales should be used to determine disability.

Conflict of Interest: Author Elif Gür Kabul, Author Ummuhan Baş Aslan, Author Bilge Başakçı Çalık, Author Murat Taşçı, and Author Veli Çobankara declare that they have no conflict of interest.

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Table 3. The relationship between DAS28 and the disability scales

	DAS28	
	r	p
DASH-total	0.655	*<0.001*
MHQS-general hand function	-0.595	*<0.001*
MHQS-daily life activities	-0.670	*<0.001*
MHQS-work performance	-0.570	*<0.001*
MHQS-pain	-0.609	*<0.001*
MHQS-aesthetics	-0.323	*0.001*
MHQS-patient satisfaction	-0.596	*<0.001*
MHQS-total	-0.708	*<0.001*
DHI-total	0.619	*<0.001*

Spearman Correlation Analysis
DAS28: Disease Activity Score 28; DASH: Disabilities of Arm, Shoulder and Hand Questionnaire; DHI: Duruoz Hand Index; MHQS: Michigan Hand Outcomes Questionnaire

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