

Which Disability Domain(s) of Health Assessment Questionnaire Is Associated with Which Age Category in Patients with Rheumatoid Arthritis? A Single Center Cohort Study

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ABSTRACT

Objective: The aim was to determine which age category had more problems in which disability domain(s) in patients with Rheumatoid Arthritis (RA).

Methods: One hundred eighty-six RA were included in the study. Patients were divided into 3 groups: Middle-aged group: 31-45 years (n=42); Adult group: 46-64 years (n=82); Elderly group: 65 years and older (n=62). Disability levels were evaluated with the Health Assessment Questionnaire (HAQ) and the level of general pain with the Visual Analogue Scale (VAS).

Results: In the middle-aged group, the age parameter had a low correlation with the “common activities” disability domain ($r=0.437$; $P=.004$) and total score ($r=0.311$; $P=.045$) of HAQ. In the adult group, VAS had a low correlation with all disability domains except the “grip” disability domain and the total score of HAQ ($r=0.240/0.370$, $P<.05$). In the elderly group, age parameter had a low correlation with the “reach” ($r=0.251$; $P=.049$) and “common activities” ($r=0.331$; $P=.008$) disability domains of HAQ, while VAS had a low and moderate correlation with all disability domains and the total score of HAQ ($r=0.344/0.568$, $P<.05$).

Conclusion: In RA, disability may be felt most in common activities in middle age, while pain may play a role in the perception of general disability in adults. While the elderly with RA continue to be under the influence of pain, they may also feel disability in reach activities in addition to common activities.

Keywords: Rheumatoid arthritis, functional status, activities of daily living, pain

Introduction


Rheumatoid Arthritis (RA) is a chronic, inflammatory and systemic disease characterized by synovial joint inflammation that can lead to severe functional disability. RA is an aggressive condition that profoundly impacts quality of life and overall well-being. Despite recent advancements in its treatment, functional impairment remains widespread, making RA one of the most prevalent chronic diseases linked with physical disability.¹ Patients with RA often struggle with routine tasks like opening doors, jars, and lifting or carrying heavy objects.²

Pain stands out as a predominant symptom of RA, frequently cited as patients' primary complaint.³ Many RA sufferers endure considerable pain, hindering their ability to engage in daily physical activities.⁴ The severity of pain significantly contributes to the level of disability, often prompting patients to avoid physical activity altogether.^{5,6}

Functional disability resulting from RA is influenced by various demographic factors such as gender, age, education level, marital status, and comorbidities, as well as disease-specific factors including rheumatoid factor, disease activity, and joint damage.^{7,8} The onset of RA can range from childhood to the later stages of life, with the highest incidence observed during the fourth and fifth decades. Consequently, disability among RA patients, particularly 65 years and older, warrants particular concern.^{9,10}

Gaining a deeper understanding of disability across different age groups enables more timely delivery of tailored services and support. This insight empowers service providers and treatment planners to establish targeted goals and implement practices aligned with individuals' specific needs.

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Enhanced coordination of programs and services catering to age- and disability-related requirements is essential.¹¹ While existing literature explores the correlation between overall disability scores in RA patients and age, studies specifically delineating the disability domains affected by age remain scarce. Consequently, the issue of physical disability across all age brackets in RA remains inadequately understood.¹²⁻¹⁵

Effectively managing RA, a condition notorious for causing severe functional disability, necessitates setting more precise goals and identifying age groups and disability domains requiring heightened attention and intervention. For this reason, the aim of this study is to group patients with RA according to age and to examine the relationship between age and the level of general pain and disability domain(s). Thus, this study was conducted based on the hypothesis that different age groups are affected by different disability domain(s).

Methods

Patients

This study was planned as a single-center cohort study. One hundred eighty-six patients, who were diagnosed with RA by a rheumatologist and followed by the rheumatology clinic of the university, were included. Patients were evaluated between 11.30.2021 and 05.18.2022.

Patients with RA were divided into three groups according to age.^{16,17}

- Middle-Aged Group: 31-45 years (n = 42),
- Adult Group: 46-64 years (n = 82),
- Elderly Group: 65 years and older (n = 62).

Inclusion criteria: Diagnosed with RA according to the 2010 American Rheumatology Association (ACR) and European Rheumatology Association (EULAR) criteria¹⁸

- 31 years or older.
- Volunteering to participate in the study.
- Exclusion criteria: Having another disease that may affect his physical condition.
- Having a history of disability, injury, or surgery in any extremity in the past year.
- Having cognitive impairment at a level that cannot cooperate.
- Being pregnant.
- Inability to understand or speak Turkish.
- Having a concurrent autoimmune or inflammatory disease.
- Having diseases affecting the central nervous system (e.g., multiple sclerosis, Parkinson's disease).
- Having serious psychiatric conditions that prevent participation.

Evaluations

Evaluations were performed by the same investigator using the face-to-face interview method. After demographic data were obtained, disability levels were evaluated with the Health Assessment Questionnaire (HAQ) and the level of general pain with the Visual Analogue Scale (VAS). Evaluations were carried out in approximately 15-20 min.

Health Assessment Questionnaire (HAQ)

Since it evaluates activities of daily living comprehensively and in all dimensions, HAQ was preferred in our study to assess the disability level. It includes 20 questions across 8 domains (dressing, arising, eating, walking, hygiene, reach, grip, and common activities). Each question is scored between 0 and 3 (without any difficulty = 0, with some difficulty = 1, with much difficulty = 2, unable to do = 3). The highest score of each subsection is summed up and divided by 8 to determine the total score between 0 and 3. A high score indicates a low functional level.¹⁹ Turkish validity and reliability were established.²⁰

Visual Analogue Scale (VAS)

It is used to convert some values that cannot be measured numerically into numerical data. Two end definitions of the parameter to be evaluated are written at the two ends of a 10 cm line, and the patient is asked to indicate where on this line their situation is appropriate by drawing a line, placing a dot, or pointing. In our study, the VAS was used to evaluate the patients' level of general pain in the last week. It was defined as 0 = "no pain," 10 = "unbearable pain."²¹

Ethical Considerations

The study was conducted in accordance with the Principles of the Declaration of Helsinki, and ethical approval was obtained from the non-interventional clinical research ethics committee of the Pamukkale University (Approval no: 21, Date: November 30, 2021). Verbal information was given and an informed consent form was signed by all patients.

Statistical Analysis

This study was planned as a single-center cohort study. Therefore, the sample of the study consists of all RA patients registered at the rheumatology clinic of the university hospital. In the post hoc power analysis for the correlation between HAQ-common activities and age in the middle-aged group, 95% confidence and 90% power were obtained. For correlation between HAQ-total and VAS in the adult group, 95% confidence and 96% power were obtained, and for correlation between HAQ-total and VAS in the elderly group, 95% confidence and 99% power were obtained. The data were analyzed with the Statistical Package for Social Sciences version 22.0 software (IBM Corp.; Armonk, NY, USA). Continuous variables were given as mean \pm standard deviation and median (minimum/maximum), and categorical variables were given as numbers and percentages. The conformity of the data to the normal distribution was examined with the Kolmogorov-Smirnov test. Spearman Correlation Analysis was used to analyze the association between continuous variables, and the Kruskal-Wallis Test was used to compare independent group differences since the data did not fit the normal distribution. In addition, the differences between categorical variables were analyzed with the Chi-Square Test. The correlation was classified as low ($r = 0.10-0.499$), moderate ($r = 0.50-0.69$), or high ($r = 0.70-1.00$).²² The statistical significance value was accepted as $P < .05$.

Results

The mean age of the middle-aged group was 38.88 ± 4.25 , the mean age of the adult group was 55.69 ± 5.14 , and the mean age of the elderly group was 70.04 ± 4.07 . It is observed that the female gender is more common in all 3 groups (middle-aged, adult, elderly; 33 (78.6%), 70 (85.4%), 48 (77.4%), respectively). There was no difference between the groups in height, weight, duration of disease, and morning stiffness ($P > .05$). The demographic and disease-related descriptive data of the patients are shown in Table 1.

In the middle-aged group, the age parameter had a low positive correlation with the "common activities" disability domain ($r = 0.437$, $P = .004$) and the total score of HAQ ($r = 0.311$, $P = .045$) (Table 2).

The VAS had a low positive correlations with all disability domains and the total score of HAQ, except for the "grip" disability domain in the adult group ($r = 0.240/0.370$, $P < .05$) (Table 2).

In the elderly group, the age parameter had a low positive correlation with "reach" ($r = 0.251$, $P = .049$) and "common activities" ($r = 0.331$, $P = .008$) disability domains of HAQ, while the VAS had low and moderate positive correlations with all disability domains and the total score of the HAQ ($r = 0.344/0.568$, $P < .05$) (Table 2).

Table 1. Demographic and Disease-related Descriptive Data of RA

Variables	Middle-Aged Adults (31-45 years)(n = 42)	Adults (46-64 years)(n = 82)	Elderly (65 years and older)(n = 62)	P*
	N (%)	N (%)	N (%)	
Gender				.427**
Women	33 (78.6)	70 (85.4)	48 (77.4)	
Men	9 (21.4)	12 (14.6)	14 (22.6)	
	Mean ± SD Median (Min/Max)	Mean ± SD Median (Min/Max)	Mean ± SD Median (Min/Max)	
Age (years)	38.88 ± 4.25 39 (31/45)	55.69 ± 5.14 56 (46/64)	70.04 ± 4.07 69 (65/80)	.001
Height (m)	1.63 ± 0.08 1.64 (1.47/1.85)	1.60 ± 0.06 1.60 (1.47/1.83)	1.60 ± 0.08 1.60 (1.45/1.82)	.094
Body weight (kg)	74.97 ± 15.89 72 (45/112)	74.86 ± 14.42 74 (47/133)	70.26 ± 11.66 70 (45/110)	.152
Duration of disease (years)	6.87 ± 4.65 5 (1/18)	10.18 ± 8.11 9 (0.58/40)	10.00 ± 7.24 8.5 (1/30)	.151
Morning stiffness (minutes)	55.44 ± 67.33 30 (0/300)	40.16 ± 55.90 20 (0/240)	31.94 ± 44.23 15 (0/240)	.061
HAQ-dressing	0.50 ± 0.80 0 (0/3)	0.75 ± 0.88 1 (0/3)	0.93 ± 1.00 1 (0/3)	.050
Arising	0.66 ± 0.81 0 (0/3)	1.02 ± 1.06 1 (0/3)	1.16 ± 1.08 1 (0/3)	.075
Eating	0.69 ± 0.86 0 (0/3)	1.01 ± 1.07 1 (0/3)	0.96 ± 1.13 0.5 (0/3)	.349
Walking	0.76 ± 0.87 0.5 (0/3)	1.01 ± 0.99 1 (0/3)	1.16 ± 0.99 1 (0/3)	.130
Hygiene	0.45 ± 0.70 0 (0/3)	0.64 ± 0.79 0 (0/3)	0.70 ± 1.01 0 (0/3)	.388
Reach	1.09 ± 0.90 1 (0/3)	1.19 ± 1.03 1 (0/3)	1.35 ± 1.17 1 (0/3)	.564
Grip	0.88 ± 1.01 1 (0/3)	1.07 ± 1.06 1 (0/3)	1.19 ± 1.29 1 (0/3)	.544
Common activities	1.02 ± 1.02 1 (0/3)	1.12 ± 1.02 1 (0/3)	1.45 ± 1.12 1 (0/3)	.099
HAQ total	0.75 ± 0.62 0.5 (0/2.38)	0.97 ± 0.73 0.87 (0/3)	1.11 ± 0.90 0.93 (0/3)	.177
VAS	4.83 ± 2.69 4.8 (0/10)	4.77 ± 2.64 4.95 (0/10)	5.31 ± 2.62 5 (0.60/10)	.602

HAQ: health assessment questionnaire, VAS: visual analogue scale, *Kruskal–Wallis Test, **Chi-square test

Discussion

In this study, the perception of general disability in middle-aged individuals with RA may be caused by disability in common activities, while pain may play a more dominant role in the perception of general disability in adults. In the elderly, the effect of pain on the perception of general disability may still continue, and they may feel more disability in activities that require lying down in addition to their common activities.

Disability is a common outcome in RA that has an impact on daily life as well as socio-economic parameters. It is also one of the causes of impairment in functional performance.^{23,24}

Considering the studies in the literature examining the association between age and disability in RA, Hammad et al reported that disability is greatly affected by age in a study which was planned to determine the factors causing disability in RA and used the modified HAQ scale. The modified HAQ scores of patients aged 40 to 60 years were

Table 2. The Eight Domains of Health Assessment Questionnaire Relationship with Age and VAS According to the Age Related Groups

	Middle-Aged Adults (31-45 years) (n = 42)				Adults (46-64 years)(n = 82)				Elderly (65 years and older)(n = 62)			
	Age		VAS		Age		VAS		Age		VAS	
	r	P	r	P	r	P	r	P	r	P	r	P
HAQ-dressing	0.109	.493	0.173	.292	0.039	.727	0.302	.007	0.245	.055	0.398	.001
Arising	0.281	.072	0.115	.487	-0.029	.793	0.345	.002	0.127	.326	0.568	.001
Eating	0.244	.119	0.080	.626	-0.005	.964	0.336	.002	0.029	.825	0.436	.001
Walking	-0.049	.757	0.150	.363	0.116	.299	0.252	.024	0.138	.286	0.385	.002
Hygiene	0.158	.317	0.136	.408	0.077	.491	0.250	.025	0.228	.075	0.344	.007
Reach	0.192	.224	0.217	.184	0.010	.930	0.240	.032	0.251	.049	0.435	.001
Grip	0.222	.158	0.225	.168	-0.011	.922	0.186	.099	0.091	.483	0.363	.004
Common activities	0.437	.004	0.190	.246	0.091	.417	0.312	.005	0.331	.008	0.482	.005
HAQ total	0.311	.045	0.279	.085	0.037	.743	0.370	.001	0.249	.051	0.516	.001

HAQ: health assessment questionnaire. Spearman correlation analysis. VAS: Visual analogue scale. Significance of the values was $P < .05$.

reported to be significantly higher than those of patients aged 20 to 40 years.¹² Similarly, Graell et al reported that older age was an independent predictor of disability for patients with RA followed up for 24 months,¹³ while Verstappen et al reported that older age and various clinical variables were associated with functional disability in RA.¹⁴

In our study, in which we grouped patients with RA according to age in parallel with the literature, it was seen that the perception of disability may increase with increasing age in middle-aged and elderly groups. In the middle-aged group, the presence of an association between age and disability, especially in common activities, may be related to the fact that patients with RA in this age group are in a more active period in terms of activities performed in daily life and have higher expectations from this domain. In addition, they may not have reached a satisfactory level of activity due to the disease's inhibitions in this domain. In the adult group, there was no association between age and disability, which can be explained by the adaptation of the patients to their conditions. In this group, pain is more prominent and may affect their perception of disability. In the elderly group, both age and pain can affect the perception of disability in more domains and with a higher relationship level. In the elderly group, there was a positive correlation between age, common activities, and also reaching in the disability domain. In the physiological process that develops with aging, the fragility of patients increases and affects their daily life activities. Accordingly, the fear of performing movements such as reaching where the balance may change and provoking pain can be explained by the increased perception of disability.²⁵

Patients with RA describe pain as one of the most important symptoms affecting their health status.²⁶ Despite early intervention, most of those affected still have moderate to high pain intensity, leading to activity limitations and limitations in participation.^{27,28}

Studies show that pain affects people's activities of daily living, that people are frustrated because they cannot do what they want or need to do, their opportunities to participate in social life are reduced, and they are dependent on family and friends for daily functioning.²⁸ Zou et al stated that the majority of RA patients have functional limitations. Age and pain are independently associated factors.²⁹ Sokka et al reported that the pain score was correlated with the HAQ score and was the primary explanatory variable for the HAQ score.³⁰ Combe et al found that the HAQ disability score at 3 and 5 years of follow-up,³¹ Graell et al reported that the Modified HAQ score at 2 years follow-up was associated with pain.¹³ Onset of RA mostly coincides with the fourth and fifth decades of life.¹⁰ While structural abnormalities are more dominant in chronic RA, inflammatory processes are more dominant in early RA.³¹ However, there is a widespread opinion that inflammation is the cause of pain in RA.³² The reason why no relationship was found between pain and disability in the middle-aged group in the present study can be explained by the prevention of pain, by controlling inflammation with pharmacological treatments in early RA nowadays. HAQ effect sizes demonstrated a decrease of 0.02 per additional year of mean disease duration. Pain scores are a strong predictor of HAQ scores. On 10 cm visual analog scales, every 1 cm increase in pain corresponds to a 0.1 increase in HAQ.³³ Independent of inflammation, a state of induced hypersensitivity of the pain system may persist in subsets of patients and lead to chronic pain. Persistent pain hypersensitivity may lead to poor global health.³⁴ The increasing relationship between pain and disability in adult and elderly groups has been attributed to chronic pain and pain hypersensitivity as a result of the increased duration of exposure to the disease.

Pain remains an important cause of disability in patients with RA, even after the inflammatory process has inhibited.³⁵ High disease activity and joint damage as a result of long-term RA may contribute to the

development of pain and even its chronicity.^{24,36} We believe that there is a relationship between pain and disability in the adult and elderly groups due to increased exposure to RA, and we see that this relationship may become stronger with increasing age. We are of the opinion that both chronic pain and increasing age affect many parameters and cause more disability in the elderly group. Increased exposure to RA therefore, is a relationship between pain and disability in the adult and elderly groups, because we see that this relationship can become stronger with advancing age. We think that both chronic pain and increasing age affect many parameters and cause more disability in the elderly group.

The strength of the present study is that the sample group is large and the number of patients with RA is well representative. Longer illness duration, longer exposure to drugs, multiple drug use, and differences in life expectancies are thought to underlie the increase in disability perception with aging.^{12,37} The limitation of the present study is that the observational and cross-sectional design offers empirical evidence of correlations among the parameters. However, it's important to note that correlations do not imply causation. Longitudinal studies are essential to establish causal relationships between the parameters. The data collected in this study lay the groundwork for such longitudinal investigations.

In future studies, the association of disability in RA can be examined by considering the factors arising from the nature of the disease, such as disease activity, in terms of different age groups, and by evaluating it according to the biopsychosocial model, which also includes personal, environmental, and emotional factors. Thus, for this multifactorial disease, factors that play a role in disability can be followed both in the evaluation and treatment of patients.

Conclusion

Making more specific classifications in determining disability levels will contribute to the use of the health system for patients and will provide important and up-to-date information on morbidity risk in the long term. In the present study, it is thought to contribute to the literature by classifying disability according to age in RA. While most disability can be seen in common activities in middle-aged individuals, pain can play a dominant role in the perception of general disability in adults with RA. While the elderly group continues to be under the influence of pain, they may feel the most disability in reaching activities in addition to their common activities. In light of these results, treatment programs can be conducted according to the age groups of patients with RA.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of Pamukkale University (Approval no: 21, Date: November 30, 2021).

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