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**To cite this article:** Gonca Bumin, Alison Hammond, Remziye Akarsu, Yeliz Prior, Büşra Kaplan, Fatma Temizkan, Özgün Belen, Yusuf Çelik, Gözde Kübra Yardimci & Umut Kalyoncu (14 Nov 2023): Adaptation and psychometric testing of the Turkish evaluation of daily activity questionnaire in people with rheumatoid arthritis, *Disability and Rehabilitation*, DOI: [10.1080/09638288.2023.2280067](https://doi.org/10.1080/09638288.2023.2280067)

**To link to this article:** <https://doi.org/10.1080/09638288.2023.2280067>



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Published online: 14 Nov 2023.



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# Adaptation and psychometric testing of the Turkish evaluation of daily activity questionnaire in people with rheumatoid arthritis

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## ABSTRACT

**Purpose:** The aims were to translate the Evaluation of Daily Activity Questionnaire (EDAQ) into Turkish, then test validity and reliability in people with rheumatoid arthritis (RA) in Turkey.

**Material and Methods:** Phase 1: The EDAQ was forward and backward translated, culturally adapted following cognitive debriefing interviews with participants with RA ( $n=10$ ) and finalized by an expert committee. Phase 2: Participants ( $n=215$ ) completed a questionnaire including the EDAQ, Health Assessment Questionnaire (HAQ), and Short-Form 36 v1 (SF-36v1). Two weeks later, the EDAQ was again completed for test–retest reliability ( $n=82:38\%$ ). Internal construct validity was assessed using Rasch analysis. Internal consistency, concurrent validity, and test–retest reliability were assessed.

**Results:** Following cultural adaptation, one item was removed, and examples increased or changed. Cronbach's  $\alpha$  values were 0.71–0.93 for all EDAQ domains, that is, acceptable to good. The EDAQ met Rasch model requirements for fit (excellent construct validity:  $p>0.05$ ). Concurrent validity was moderate to strong for most EDAQ domains with HAQ ( $r_s$  0.49–0.81) and SF-36-v1 Physical Function ( $r_s$  0.42–0.70). There was excellent test–retest reliability for all domains (ICC (2,1): 0.95–1.00).

**Conclusion:** The Turkish EDAQ is a valid, reliable measure of daily activity ability for use in practice and research with Turkish speakers with RA.

## ARTICLE HISTORY

Received 10 May 2023  
Revised 31 October 2023  
Accepted 1 November 2023

## KEYWORDS

Rheumatoid arthritis; activities of daily living; validity; reliability; Rasch analysis

## > IMPLICATIONS FOR REHABILITATION

1. The Evaluation of Daily Activity Questionnaire provides a comprehensive evaluation of daily activity ability for people with rheumatic and musculoskeletal diseases.
2. The Turkish Evaluation of Daily Activity Questionnaire is a valid, reliable patient-reported outcome measure in patients with rheumatoid arthritis, who considered it easy to complete.
3. The Turkish Evaluation of Daily Activity Questionnaire is suitable for use in clinical practice and research to evaluate daily activity ability in people with rheumatoid arthritis.

## Introduction

Patient-reported outcome measures (PROM) play an essential role in clinical practice and research to evaluate functional problems in patients with rheumatic and musculoskeletal disorders (RMD). These PROMs assess the impact of rehabilitation programs on daily activities in the domains of communication, mobility, self-care, and domestic life, as defined by the International Classification of Functioning, Disability, and Health (ICF) [1]. Currently, measurement tools, such as the Health Assessment Questionnaire (HAQ) [2] and Arthritis Impact Measurement Scales 2 [3], are limited in their utility for treatment planning as they assess too few activities. In response to this limitation, the Evaluation of Daily Activity Questionnaire (EDAQ) was developed in Sweden during the 1990s to provide a comprehensive evaluation of common symptoms (Part 1) and an in-depth measurement of activity limitations (Part 2) in patients with rheumatoid arthritis (RA) [4]. The EDAQ can be completed at home, providing patients

with sufficient time to reflect on their abilities and limitations, and typically takes 25 to 35 min to complete.

Hammond et al. [5] developed an English version of the EDAQ which was updated, and linguistically and culturally validated for use in the United Kingdom (UK). The EDAQ was demonstrated to have good content, concurrent and discriminant validity and test–retest reliability in eight RMDs: rheumatoid arthritis, ankylosing spondylitis, osteoarthritis, systemic lupus erythematosus, systemic sclerosis, chronic pain, chronic hand/upper limb musculoskeletal disorders, and primary Sjögren's syndrome [6–8]. These conditions were selected as people with these diagnoses are often referred to occupational therapy. Dutch and German versions of the EDAQ are also available [9]. An EDAQ User Manual is available to guide its use [10].

A Turkish version of the EDAQ will enable its use, with Turkish speakers with RA, to comprehensively identify their daily living activity difficulties, in both clinical practice and research. The aims of this study were to translate and culturally adapt the EDAQ into

Turkish (Phase 1), and to evaluate its validity and reliability in patients with RA (Phase 2).

## Materials and methods

### Participants and recruitment

Participants were recruited from the Rheumatology Subdivision of the Department of Internal Diseases at Hacettepe University, Faculty of Medicine, Ankara, Turkey. The inclusion criteria were: (1) being 18 years of age or older, (2) having a confirmed diagnosis of RA, made by a Rheumatology Consultant [11], and (3) being able to read, write, and comprehend Turkish. Exclusion criteria included inability to provide informed consent, changes in disease-modifying medication regimen in the past three months, and the presence of neurological or psychiatric conditions affecting daily activities.

### Ethical approval

The study was approved by the Noninterventional Clinical Research Ethics Board of Hacettepe University on 23.02.2021 (Decision Number 2021/07-19) and all participants provided written, informed consent before participating.

The study was conducted in two phases:

### Phase 1: Linguistic and cultural Adaptation

The aims were to translate the English EDAQ into Turkish and eliminate any items not culturally applicable in Turkey. This was achieved through a cultural/linguistic validation process, following the method developed by Beaton et al. including obtaining feedback from participants with RA regarding cross-cultural variations in daily living activities [12]. Phase 1 consisted of two steps:

#### Translation

The English version of the EDAQ was translated into Turkish. Forward translation was conducted by two native Turkish speakers who were highly proficient in English. An expert committee, consisting of translators, and members of the research team (which included two patient research partners), then held the Internet conferences to resolve any discrepancies between the two forward translations item by item. The committee reached a consensus and agreed on a single Turkish translation of the EDAQ.

The draft Turkish version of the EDAQ was then backtranslated. Two native English speakers, who were proficient in Turkish but not healthcare professionals, conducted this to ensure an unbiased translation. After back-translations were completed, these were compared with the English EDAQ. Discrepancies were discussed with the English EDAQ developers, and a consensus reached with the expert committee. The final version of the Turkish EDAQ was then evaluated in the second step.

During the translation process, difficulties were encountered regarding the naming of certain phrases and assistive devices. This issue was resolved through collaboration between the research teams in the UK and Turkey, who worked to provide accurate names and statements through discussion and the use of photographs.

#### Cultural adaptation

The draft Turkish EDAQ was tested with 10 participants with RA, to refine the translation through cultural adaptation. Participants

completed the Turkish EDAQ and then took part in a cognitive debriefing interview to provide feedback on the comprehensiveness, length, ease of completion, and relevance of the items included. They identified any activities that were commonly problematic in Turkey but missing from the English EDAQ, as well as those activities in the EDAQ not considered problematic or relevant in Turkey.

Participants reported that questionnaire completion (parts 1 and 2) took approximately 25 min and was relatively easy, although some found it lengthy. Feedback was provided, with six participants suggesting modifications to examples in some items and increasing the number of examples. Eight participants indicated that the “filling the car with petrol” activity was not culturally relevant as, in Turkey, garages are not self-service. (In the future, this item may need re-consideration with the growth in electric car use). Seven participants suggested changing the phrase “open the front/back door” to “open the outer door.” All participants considered the other activities in Part 2 culturally appropriate and reflected the impact of their condition. Overall, participants considered that the EDAQ provides sufficient information for healthcare professionals to assess their current situation.

Following a review of the cognitive debriefing reports, the research team made modifications to Part 2 domains. Specifically, in the “Eating/Drinking” domain, item 7 was updated to reflect that beer is not a commonly consumed beverage in Turkish culture. As a result, the term “lager” was revised to “soda bottle.” In the “Moving Around Indoors” domain, item 2 was revised from “Open the front/back door” to “Open the outer door,” as such doors are commonly referred to as “outer doors” in Turkish houses. Additionally, item 12 was updated from “(e.g. controls, wood burner, multifuel stove, open fire)” to “(e.g. burning stoves, adjusting the temperature of the heater, using an electric heater)” to reflect the use of heating stoves and electric heaters in Turkey. In the “Moving Around Outside/Shopping” domain, item 2 was revised to reflect the standard unit of distance measurement used in Turkey, that is, kilometers, with “(e.g. a mile)” changed to “(e.g. 1.5 km)”. Additionally, item 7 was omitted as “filling a car with petrol” is not a widespread activity in Turkey. In the “Leisure & Social Activities” domain, item 3 was revised to better reflect cultural norms in Turkey. Specifically, the expression “(e.g. pub)” was changed to “(e.g. cafe/coffee house),” as these are more prevalent in Turkey than pubs (i.e. public houses where alcohol is sold). In item 6, the term “Quiet recreation” was updated to “Quiet activities” as “recreation” is not a widely used term in Turkey.

The expert committee then reviewed participants’ feedback and made changes to the Turkish EDAQ by adding any new items suggested by at least five participants, or removing items deemed inappropriate by at least five participants. The final version of the Turkish EDAQ was then ready for psychometric testing.

### Phase 2: Testing psychometric properties

#### Procedures

Participants were asked to complete an online survey, or mailed questionnaire booklet, including the Turkish EDAQ and several other measures (detailed below) to assess the concurrent validity of the EDAQ by comparison with measures of the same and related constructs.

**Sociodemographic information.** This included age; sex; educational background; living alone or with significant others; whether children under 18 years living at home; caring responsibilities for older relatives; as well as comorbidities, disease duration, and current medication.

**The EDAQ.** This was developed to meet the needs of occupational therapists, physiotherapists, and other health professionals for a valid, reliable, and detailed Patient Reported Outcome Measure (PROM) of daily activity ability [4,6]. It is used in clinical practice in RA and other RMD. It consists of three parts. Part 1 includes ten numeric rating scales (NRS) evaluating common symptoms (e.g. pain, fatigue) and effects of arthritis (e.g. on sleep, mood). Each is scored from 0 (none) to 10 (severe). This corresponds to Body Functions in the ICF [13]. Part 2 consists of 14 domains, including 138 activities identified by people with RA as often problematic. Twelve of these can be combined to form two components: Self-Care (i.e. the domains of Eating, Dressing, Personal Care, Cooking, House Cleaning, Laundry, and Communication); and Mobility (i.e. the domains of Bathing, Moving Inside the Home, Transfers, Moving Outside the Home, Gardening and Household Maintenance). In addition, there are two other domains: Caring, and Leisure/Social Activities. Part 2 corresponds to Activity and Participation in the ICF. Items are scored on a four-point Likert scale evaluating ability to perform daily activities (0=no difficulty, 3=unable to do). If the person does not perform this activity in daily life (for reasons other than health), the “not applicable” option is marked. Each EDAQ domain is divided into two parts. Section A questions abilities without using assistive devices, alternative methods, or any assistance. Section B questions abilities with assistive devices, and alternative methods. In ICF terminology, section A is about capacity and section B performance. Items are summed to form a total score for Sections A and B in each domain. Any decrease in points between Sections A and B indicates the effect of ergonomic solutions on improving activity ability. If there are missing items in a domain, the total domain score cannot be calculated. Higher scores indicate more activity limitations. Part 3 is optional and includes a checklist of assistive devices [6,9].

**The HAQ.** This evaluates daily activities of people with arthritis. It is usually used with RA and osteoarthritis patients. It is a self-report measure, taking about 10 min to complete. It contains 20 items classified into eight domains. Items include dressing, eating, sitting up, hygiene, walking, grasping, and reaching out. The questionnaire is scored with a four-point Likert scale (0=no difficulty to 3=unable to do) [2]. A higher score indicates greater disability. The Turkish version has good validity and reliability in RA [14].

**The short form 36 version 1 (SF-36v1).** This is a general health questionnaire evaluating, in the last four weeks, perceptions of quality of life in eight sub-scales (36 items) scored as: Physical Role Limitations, and Emotional Role Limitations (yes/no); Physical Functioning (three-point Likert scale), Bodily Pain, Social Function and General Health (five-point Likert scales); and Vitality, and Mental Health (six-point Likert scales) Each sub-scale is transformed to a 0 and 100 scale, with a high score indicating good health. It is a generic measure, i.e. it can be used to measure and compare outcomes in different diseases and treatments, unlike disease-specific assessments [15]. The Turkish SF-36v1 has good validity and reliability in RA [16].

**The rheumatoid arthritis quality-of-life questionnaire (RAQoL).** This is a disease-specific, multidimensional quality-of-life scale developed for use with patients with RA. It consists of 30 questions answered as yes or no. Scores range from 0 to 30, with a high score indicating low quality of life [17,18]

Data collection occurred during the Covid-19 pandemic. Due to concerns for health and safety, sociodemographic information, data were collected online *via* a Google Form questionnaire. This was e-mailed to participants with RA, including a web link to a Google form. For those participants without access to e-mail or the Internet, a paper questionnaire was mailed. The Turkish EDAQ was administered to participants twice (Test 1 and Test 2), with a two-week interval between, to assess test-retest reliability. To match participants’ responses between Test 1 and Test 2, an Identification (ID) generation system was used, providing a unique ID number based on the participant’s initial letters, birth date, and place of birth. This protected confidentiality and ID numbers were only accessible to members of the research team.

**Sample size.** Reliability of the two components of the EDAQ in the Rasch model for the English language version was 0.91 (Self-Care) and 0.88 (Mobility) [9]. Assuming that this rate will be 90%, with 5% probability of error, and 90% power using the R (software/programming-version 3.6.2 – CRAN) program [19], it was calculated that the total sample size required should be at least 210. At least 80 (38%) responses were required for test-retest reliability [9].

**Data analysis.** Normality of data was first assessed with the Kolmogorov-Smirnov test, as the EDAQ, HAQ, SF-36v1, and RAQoL, are evaluated using rating scale items, rendering the data fundamentally ordinal. As a result, most data were analyzed using non-parametric statistical methods. Median and interquartile ranges were used to describe ordinal data and means and standard deviation for continuous variables.

**Internal construct validity.** This was assessed for each domain of the Turkish EDAQ and its two components, Self-Care and Mobility, using Rasch analysis. The Rasch Model, developed by Georg Rasch, was utilized to assess the reliability of both persons and items in the questionnaire. The Rasch Model allows for easy measurement comparisons by estimating the difficulty of items and the abilities of individuals. It also enables the evaluation of latent characteristics, such as attitudes or abilities, of individuals [20, 21].

**Internal consistency.** This was assessed using Cronbach’s Alpha ( $\alpha$ ). This assesses the degree of interrelatedness between items in a scale. A commonly accepted rule for interpretation is  $\alpha \geq 0.90$ =excellent;  $0.90 > \alpha \geq 0.80$ =good;  $0.80 > \alpha \geq 0.70$ =acceptable;  $0.70 > \alpha \geq 0.60$ =doubtful;  $0.60 > \alpha \geq 0.50$ =weak;  $0.50 > \alpha$  = unacceptable [20,22].

**Concurrent validity.** This was assessed using Spearman’s correlations. In part 1, NRS scores were compared with relevant SF-36v1 Physical Functioning, Bodily Pain, Vitality and/or Mental Health sub-scales and/or the RAQoL. Not all scales had directly applicable comparator measures. In part 2, each of the 14 EDAQ domains was compared with the HAQ, SF-36v1 Physical Functioning, Role Physical, Bodily Pain and Vitality scales, and RAQoL. Correlations were interpreted as very strong = 0.90–1; strong = 0.70–0.89; moderate = 0.40–0.69; weak = 0.10–0.39; and negligible = 0.00–0.10 [23].

**Test-retest reliability.** This was assessed using intraclass correlation coefficients (ICC) (2,1): two-way random consistency, average measures model. for Part 1 NRS, each domain in Part 2, and the two components of Self-Care and Mobility/Participation. An ICC of  $\geq 0.75$  is considered excellent and 0.5–0.74 moderate [24].

The time interval between tests was two-weeks as this is the most frequently recommended interval [25].

**Floor and ceiling effects.** These were considered present if more than 15% of participants scored either the lowest (floor) or highest (ceiling) scores in any domain [26].

All statistical analyses reported above were performed using R software/programming (version 3.6.2 (2019-12-12) - CRAN) [19].

## Results: Phase 2

### Participants

Out of the 291 participants recruited, 215 (73.88%) returned the fully completed first questionnaire booklet/online survey. Of these, 82 (38%) completed and returned the second booklet/survey. Table 1 shows the participants' demographic data. All reported that they had not participated in a patient education program to help them manage their arthritis.

### Internal construct validity (Rasch analysis)

By matching the validity expectations of the Rasch model, it was demonstrated that the EDAQ Part 2 had excellent internal construct validity ( $p > 0.05$ ) (Table 2.). Each domain can be used as a stand-alone measure, as well as collectively within the two components of Self-Care, and Mobility (Table 2.).

**Table 1.** Descriptive statistics of participants with rheumatoid arthritis ( $n = 215$ ).

( $n = 215$ )	$n$ (%)	Mean (SD)	Median (IQR)
Sex:			
Female	179 (83.30)		
Male	36 (16.70)		
Age (years)		56.20 (12.30)	
Age at diagnosis (years)		42.50 (10.30)	
Disease duration (years)		13.90 (7.90)	
Comorbidities, $n$ (%)			
Yes	31 (14.42)		
Hypertension	15 (6.97)		
Asthma	4 (1.86)		
Diabetes Mellitus	4 (1.86)		
Anemia	2 (0.93)		
Cardiac arrhythmia	2 (0.93)		
Hashimoto's thyroid	1 (0.46)		
Chronic obstructive pulmonary disease	1 (0.46)		
Fibromyalgia	1 (0.46)		
Celiac Disease	1 (0.46)		
No	184 (85.58)		
Working			
Yes	34 (15.80)		
No	181 (84.20)		
Living status:			
<b>alone</b>	29 (13.50)		
<b>with others</b>	186 (86.50)		
Children under 18 years living at home	41 (19.00)		
Caring responsibilities for older relatives	16 (7.50)		
Short Form 36v1			
Physical Function		50 (30–70)	
Role Physical		50 (0–100)	
Vitality		50 (35–65)	
Mental Health		52 (40–60)	
Bodily Pain		57.50 (45.00–77.50)	
Health Assessment Questionnaire		0.43 (0.20–0.80)	
Rheumatoid Arthritis Quality of Life		15 (10–20)	

**Key:** EDAQ: Evaluation of Daily Activity Questionnaire.

### Internal consistency

Cronbach's alpha values were excellent for Dressing, Bathing and Showering, and Cooking domains (i.e.  $\geq 0.90$ ). For all other domains, Cronbach's alpha values were good (i.e.  $\alpha = 0.80–0.89$ ), except for Gardening and Household Maintenance, and Leisure and Social Activities ( $\alpha = 0.71$ ) (Table 2.). All domains had  $\alpha$  values consistent with group use (i.e.  $\geq 0.70$ ), and most with individual use (i.e.  $\geq 0.85$ ) [20].

### Concurrent validity

In the EDAQ Part 1, there were generally moderate correlations with relevant SF36v1 Mental Health, Physical Function, Bodily Pain and Vitality scores ( $r_s = -0.41$  to  $-0.68$ ); and moderate with RAQoL scores ( $r_s = 0.43–0.66$ ) (Table 3.).

In EDAQ Part 2, most domains correlated moderately to strongly with the HAQ ( $r_s = 0.49–0.81$ ), apart from Gardening and Household Maintenance which was weak ( $r_s = 0.19$ ), and Caring was not correlated. SF-36v1 Physical Function correlated moderately to strongly with most domains ( $r_s = -0.42$  to  $-0.70$ ), apart from Leisure and Social Activities, and Communication, which were weak ( $r_s = -0.34$  and  $-0.31$ , respectively). The Gardening and Household Maintenance and Caring domains were not significantly correlated. The SF-36v1 Role Physical correlated moderately to strongly with most EDAQ domains ( $r_s = -0.44$  to  $-0.66$ ) apart from Gardening and Household Maintenance, and Caring, which correlated weakly ( $r_s = 0.26$  and  $0.19$ , respectively). Most domains correlated weakly to moderately with SF-36v1 Bodily Pain ( $r_s = -0.25$  to  $-0.61$ ) and Vitality scores ( $r_s = -0.23$  to  $-0.49$ ), apart from Gardening and Household Maintenance, and Caring, which were not significantly correlated. The RAQoL correlated weakly to strongly with EDAQ domains ( $r_s = 0.29–0.71$ ) apart from Gardening and Household Maintenance, which was only weakly correlated ( $r_s = 0.12$ ) (Table 4.).

**Table 2.** Internal consistency (Cronbach's alpha) and Rasch analysis summary for the EDAQ Section A ( $n = 215$ ).

EDAQ domain (score range)	Cronbach's $\alpha$	$P$ value	Discriminant item
1. Eating and drinking (0–33)	0.89	0.26	1.70
2. In the bathroom and personal care (0–36)	0.86	0.26	1.00
3. Dressing (0–33)	0.93	0.32	1.00
4. Bathing and showering (0–33)	0.91	0.32	1.00
5. Cooking (0–42)	0.93	0.28	1.00
6. Moving indoors (0–36)	0.87	0.20	1.00
7. Cleaning the house (0–27)	0.85	0.26	1.00
8. Laundry and clothes care (0–27)	0.88	0.32	1.00
9. Moving and transfers (0–18)	0.81	0.28	1.00
10. Communication (0–18)	0.80	0.30	1.00
11. Moving outdoors and shopping (0–39)	0.83	0.30	1.00
12. Gardening and household maintenance (0–21)	0.71	0.16	1.00
13. Caring (0–27)	0.81	0.26	1.00
14. Leisure and social activities (0–27)	0.71	0.20	1.00
Self-care	0.85	0.20	1.00
Mobility/Participation	0.83	0.26	1.00
<b>Ideal value</b>		<b>&gt;0.05</b>	

**Key:** EDAQ: Evaluation of Daily Activity Questionnaire.

### Test-retest reliability

All Part 1 NRS had excellent reliability with ICC (2,1) of 0.97 and above (Table 3.). The ICC (2,1) between Test 1 and Test 2 EDAQ domain scores in Part 2 sections A and B, and for the two components, were excellent at 0.95 and above (Table 5.).

### Floor and ceiling effects

All domains in the Turkish EDAQ, except Eating and Drinking, Cooking, Moving Indoors, Cleaning the House, Move Outdoors, and Shopping had floor effects. There were no ceiling effects (Table 6).

**Table 3.** EDAQ Part 1: concurrent validity with relevant comparator measures, and test-retest reliability.

Numerical rating scale (0–10)	Comparator measures (r <sub>s</sub> ) (n=215)	Test 1, median (IQR) (n=215)	Test 2, median (IQR) (n=82)	ICC (2,1) (95% CI) (n=82)
Disease activity	-0.63*** <sup>a</sup>	3 (1.5–4.5)	2 (1–4.5)	0.99 (0.96–0.99)***
Mood	0.54*** <sup>b</sup>	4 (2.5–4)	4 (2.5–4)	0.99 (0.98–0.99)***
Pain when resting	0.43*** <sup>a</sup>	2 (1–3.5)	2 (1–3.5)	0.99 (0.97–1.00)***
Pain when moving	0.61*** <sup>a</sup>	4 (1.5–5.5)	4 (1.5–5.5)	0.99 (0.99–1.00)***
Stiffness	-0.39*** <sup>c</sup>	3 (1–6)	3 (1.5–6)	0.99 (0.97–1.00)***
Joint movement limitations	-0.41*** <sup>c</sup>	4 (2–4.5)	4 (2–4)	0.99 (0.98–1.00)***
Fatigue	-0.42*** <sup>d</sup>	5 (3–7)	5 (2.5–7)	0.99 (0.97–0.99)***
Worry	0.48*** <sup>b</sup>	3 (3–6)	3 (2.5–6)	0.99 (0.98–1.00)***
Sleep	-0.40*** <sup>a</sup>	1 (1–5)	1 (1–5)	1.00***
Satisfaction with life	0.51*** <sup>e</sup>	3 (2–4)	3 (2–4)	0.97 (0.93–0.99)***

**Key:** CI: confidence interval; EDAQ: Evaluation of Daily Activity Questionnaire; ICC: intra-class correlation coefficient; IQR: Inter-Quartile Range; r<sub>s</sub>: Spearman's correlations; <sup>a</sup>: Short Form 36v1 Bodily Pain; <sup>b</sup>: Short Form 36v1 Mental Health; <sup>c</sup>: Short Form 36v1 Physical Functioning; <sup>d</sup>: Short Form 36v1 Vitality; <sup>e</sup>: Rheumatoid Arthritis Quality of Life scale; \*\*\*: p < 0.001.

### Discussion

The Turkish EDAQ was culturally and linguistically validated in this study. Only minimal updates were needed to ensure consistency across Turkish and English language versions, with very few cultural adaptations necessary. Despite the length of the EDAQ, participants during the cognitive debriefing interviews found the Turkish version to be acceptable and beneficial for increasing communication with health professionals regarding their activity restrictions. The Turkish EDAQ demonstrated good psychometric properties in people with RA.

The EDAQ was developed for use in RMD rehabilitation and provides a complete evaluation of a person's ability to carry out daily activities. There are 14 domains, 12 of which can be joined to create two components: Self Care; and Mobility/Participation. The EDAQ is unique in that it makes a distinction between actual disability and intrinsic disability, that is, Section A without adjustments to the environment or ergonomics, and Section B, with such modifications. The Turkish EDAQ adheres to most of the US Food and Drug Administration's (FDA) recommendations for PROMs [27] and activities included are those that people with RA find the most pertinent.

The EDAQ Part 2 was shown to have strong internal construct validity by meeting Rasch model expectations. To create each domain and the two-component scores, the raw scores for each domain and component's items can therefore be summed. Additionally, data from the Turkish EDAQ can now be compared and pooled with versions from different countries and languages [9].

In terms of concurrent validity, most EDAQ domains had moderate to strong correlations with SF-36v1 sub-scales of Physical Function, Role Physical, Mental Health, Vitality, and Bodily Pain in people with RA. In the English, Dutch, and German versions of the EDAQ, strong correlations with Physical Function and Bodily Pain, and moderate correlations with Vitality were also reported [6,8,9].

Similar to the previous studies for the English, Dutch and German language versions, few people had caring obligations, which resulted in the Caring domain having only weak correlations with other measures. To verify validity for those who have caring obligations, more research is required to test this domain in samples with more parents with small children. However, for Gardening and Household Maintenance, correlations were also often weak. This may be because most participants lived in a city and many in apartments, meaning gardening was not

**Table 4.** Concurrent validity of EDAQ Part 2 section A scores with comparator measures (spearman's correlations) (n=215).

EDAQ domain (score range)	HAQ <sub>s</sub>	SF36v1 PF <sub>s</sub>	SF36v1 RP <sub>s</sub>	SF36v1 VT	SF36v1 BP	RAQoL
1. Eating and drinking (0–33)	0.79***	-0.64***	-0.61***	-0.49***	-0.57***	0.66***
2. In the bathroom and personal care (0–36)	0.56***	-0.42***	-0.63***	-0.41***	-0.41***	0.57***
3. Dressing (0–33)	0.64***	-0.50***	-0.53***	-0.42***	-0.25***	0.56***
4. Bathing and showering (0–33)	0.74***	-0.50***	-0.47***	-0.27***	-0.31***	0.5***
5. Cooking (0–42)	0.79***	-0.54***	-0.52***	-0.35***	-0.43***	0.59***
6. Moving indoors (0–36)	0.75***	-0.70***	-0.52***	-0.45***	-0.47***	0.57***
7. Cleaning the house (0–27)	0.81***	-0.63***	-0.57***	-0.53***	-0.32***	0.67***
8. Laundry and clothes care (0–27)	0.66***	-0.54***	-0.55***	-0.35***	-0.37***	0.56***
9. Moving and transfers (0–18)	0.70***	-0.57***	-0.64***	-0.49***	-0.61***	0.67***
10. Communication (0–18)	0.50***	-0.31***	-0.44***	-0.34***	-0.27***	0.34***
11. Moving outdoors and shopping (0–39)	0.81***	-0.68***	-0.52***	-0.43***	-0.57***	0.60***
12. Gardening and household maintenance (0–21)	0.19*	-0.10	-0.26***	-0.08	-0.08	0.12
13. Caring (0–27)	0.10	-0.10	-0.19**	-0.03	-0.13	0.90***
14. Leisure and social activities (0–27)	0.49***	-0.34***	-0.44***	-0.23**	-0.28***	0.29***
<b>Self-care</b>	0.83***	-0.64***	-0.66***	-0.46***	-0.49***	0.71***
<b>Mobility/Participation</b>	0.82***	-0.67***	-0.59***	-0.42***	-0.52***	0.63***

**Key:** EDAQ: Evaluation of Daily Activity Questionnaire; r<sub>s</sub>: Spearman correlations; SF36v1: Short form 36v1; PF: Physical Functioning; RP: Role Physical; BP: Bodily Pain; VT: Vitality; HAQ: Health Assessment Questionnaire; RAQoL: Rheumatoid Arthritis Quality of Life scale. Higher scores better in SF36v1, Lower scores better in HAQ and RAQoL.

\*p < 0.05; \*\*p < 0.01; \*\*\*p < 0.001.

Table 5. EDAQ Part 2: median (IQR) scores and test-retest reliability ( $n=82$ ).

EDAQ domain (score range)	Test 1		Test 2		ICC (2,1)	
	Section A Score	Section B Score	Section A Score	Section B Score	Section A	Section B
1. Eating and drinking (0–33)	5 (0–10.5)	5 (0–10.5)	5 (1–10)	5 (1–10.5)	0.99 (0.97–1.00)	0.99 (0.98–1.00)
2. In the bathroom and personal care (0–36)	2 (0.5–2.5)	2 (0.5–2)	2 (1.5–3)	2 (1.5–3)	0.98 (0.94–0.99)	0.98 (0.94–0.99)
3. Dressing (0–33)	3 (0–8.5)	3 (0–8)	4 (1.5–10.5)	4 (1.5–10)	0.98 (0.89–1.00)	0.98 (0.86–1.00)
4. Bathing and showering (0–33)	4 (1–9)	3 (0.5–7)	5 (2–10)	4 (1–8)	0.99 (0.97–1.00)	0.98 (0.93–0.99)
5. Cooking (0–42)	7 (2.5–11.5)	6 (2–11)	7 (2–11.5)	6 (1.5–11)	0.99 (0.98–1.00)	0.99 (0.97–1.00)
6. Moving indoors (0–36)	7 (1–9.5)	7 (1–9.5)	7 (2.5–11)	7 (2.5–11)	0.98 (0.96–0.99)	0.98 (0.96–0.99)
7. Cleaning the house (0–27)	7 (2.5–13)	7 (2.5–13)	6 (2.5–13)	6 (2.5–13)	0.99 (0.98–1.00)	0.99 (0.98–1.00)
8. Laundry and clothes care (0–27)	1 (0–4)	1 (0–4)	2 (1–4.5)	2 (1–4.5)	0.99 (0.96–1.00)	0.99 (0.96–1.00)
9. Moving and transfers (0–18)	2 (0–3.5)	2 (0–3.5)	2 (0.5–4.5)	2 (0.5–4.5)	0.98 (0.96–0.99)	0.98 (0.96–0.99)
10. Communication (0–18)	0 (0–1.5)	0 (0–1.5)	1 (0–2)	1 (0–2)	0.99 (0.92–0.99)	0.98 (0.92–0.99)
11. Moving outdoors and shopping (0–39)	7 (1–10.5)	7 (1–10.5)	8 (2–11)	8 (2–11)	0.99 (0.95–1.00)	0.99 (0.95–1.00)
12. Gardening and household maintenance (0–21)	0 (0–0)	0 (0–0)	0 (0–1)	0 (0–1)	0.95 (0.87–0.98)	0.95 (0.87–0.98)
13. Caring (0–27)	0 (0–0.5)	0 (0–0.5)	1 (0–1.5)	1 (0–1.5)	0.98 (0.95–0.99)	0.98 (0.95–0.99)
14. Leisure and social activities (0–27)	0 (0–1.5)	0 (0–1.5)	0 (0–2)	0 (0–2)	0.98 (0.94–0.99)	0.98 (0.94–0.99)
<b>Self-care</b>	22 (13.5–45)	22 (13–43)	26 (16–46)	27 (16.5–45)	0.97 (0.92–1.00)	0.97 (0.92–1.00)
<b>Mobility/Participation</b>	23 (6–26.5)	21 (5.5–25)	24 (7.7–29)	23 (7–27)	0.99 (0.95–1.00)	0.99 (0.94–1.00)

**Key:** CI: confidence interval; EDAQ: Evaluation of Daily Activity Questionnaire; ICC: intra-class correlation coefficient; IQR: Inter-Quartile Range.

\* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ .

Table 6. Floor effects in the EDAQ Part 2 domains  $n=215$ .

EDAQ domain	Floor effects $n$ (%)
<b>No floor effects:</b>	
Cooking	20 (9.30)
Moving indoors	21 (9.76)
Cleaning the house	20 (9.30)
Moving outdoors and shopping	22 (10.23)
Eating and drinking	28 (13.02)
<b>Floor effects:</b>	
Bathing and showering	34 (15.81)
Moving and transfers	34 (15.81)
Dressing	35 (16.27)
In the bathroom and personal care	36 (16.74)
Laundry and clothes care	40 (18.60)
Leisure and social activities	63 (29.30)
Communication	67 (31.16)
Gardening and household maintenance	68 (31.62)
Caring	78 (36.27)

**Note:** There were no ceiling effects. Key: EDAQ=Evaluation of Daily Activity Questionnaire.

relevant for many. In addition, most participants were women. In Turkey, many of the activities in the Gardening and Household Maintenance domain are predominantly performed by men.

The EDAQ can be utilized for both group and individual measurement in RA. The EDAQ's internal consistency and test-retest reliability were comparable to those of the English, Dutch, and German EDAQ [9]. Health professionals can select which domains to use in clinical practice because each domain is reliable and valid (apart from the latter in Caring, and Gardening and Household Maintenance, which should be used with caution). For instance, the client might complete the EDAQ in its entirety initially. The client then needs to only complete those domains during re-assessment if their rehabilitation solely focused on only a few domains.

The limitations of the study included that most participants were women, and few had childcare roles. These are most likely the reasons for weak correlations with comparator measures for EDAQ domains, particularly Gardening and Household Maintenance,

and Caring. Floor effects were observed in most domains, potentially because many participants had good health. In addition, a shorter time interval between test 1 and test 2 may have resulted in improved test-retest reliability, as RA is a disease with fluctuating symptoms. Information about the medication regimens of participants would also have provided more descriptive information about the sample.

In conclusion, the Turkish EDAQ is a valid and reliable measure that can be used in people with RA. The Self-Care and Mobility components, or individual domains, can be utilized in clinical practice to examine patients' daily activity challenges, assist in developing solutions to these, and evaluate the outcome of rehabilitation. The Turkish EDAQ is also suitable for use in research. Further research is needed to assess the Turkish EDAQ's validity and reliability in other RMDs, to enable it to be used in a wider variety of conditions.

## Disclosure statement

No potential conflict of interest was reported by the authors.

## Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

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## Data availability statement

The datasets used and/or analyzed during this study are available from the lead author upon reasonable request. The Turkish EDAQ is available from the lead author.

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