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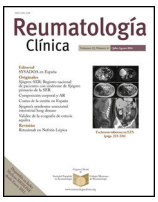

Original Article

Validation of the HAQ-UP-A (Health Assessment Questionnaire-Upper Limbs-Argentine Version) in patients with rheumatoid arthritis☆

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ABSTRACT

HAQ is considered the gold standard for the evaluation of functional capacity in patients with rheumatoid arthritis (RA), even though it does not focus in any particular anatomical region. With the objective of assessing functional disability of the hand in elderly patients with osteoarthritis, Baron et al. used a modified version of the HAQ which was calculated as the mean value for those categories involving mostly upper extremities and named it 'HAQ-UP'. This instrument has not been validated in patients with RA.

Objetive: To valídate HAQ-UP argentine version in patients with RA.

Methods: Cross-sectional study. Consecutive patients ≥ 18 years with diagnosis of RA (ACR/EULAR 2010) were included. Socio-demographic data and RA characteristics were recorded. Questionnaires were administered: HAQ-A, HAQ-UP-A, FIHOA, Quick DASH. The reproducibility of the questionnaire was assessed.

Results: A total of 100 patients were included, 83% women, mean age 57.9 years (SD 11.6). Cronbach's alpha test was 0.94. The intra-item correlation did not show redundant questions. HAQ-UP-A showed excellent correlation with HAQ-A (r = 0.93); FIHOA (r = 0.89) and Quick DASH (r = 0.91). It also showed good correlation with DAS28-ESR (r = 0.68) and other composite disease activity indices as well as with other parameters of the disease. There was no correlation between HAQ-UP-A and disease duration. The reproducibility of the questionnaire was 0.82. Multiple linear regression adjusted for age and sex showed patient global VAS as the main determinant of HAQ-UP-A, followed by the presence of morning stiffness.

Conclusion: HAQ-UP-A was found to be reliable, valid and reproducible in patients with RA, representing a useful tool for the evaluation of the functional capacity of the upper limbs in these patients.

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Validación del HAQ-UP-A

Palabras clave:
Artritis reumatoidea
Capacidad funcional
HAQ-UP

RESUMEN

El HAQ se considera el estándar de oro para la evaluación de la capacidad funcional en pacientes con artritis reumatoidea (AR), realizando una valoración global de la misma. Con el objetivo de evaluar la incapacidad funcional de la mano en pacientes ancianos con osteoartritis, Baron et al. utilizaron una versión modificada del HAQ al que llamaron 'HAQ-UP'. Este instrumento no ha sido validado en pacientes con AR.

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Objetivo: Validar la versión argentina del HAQ-UP en pacientes con AR.
Métodos: Estudio de corte transversal. Se incluyeron pacientes consecutivos ≥18 años con diagnóstico de AR (ACR/EULAR 2010). Se consignaron datos demográficos y características de la enfermedad. Se completaron los cuestionarios HAQ-A, HAQ-UP-A, FIHOA y Quick DASH. Se estableció la reproducibilidad del cuestionario.
Resultados: Se incluyeron 100 pacientes, 83% mujeres, edad media 57,9 años (DE 11,6). La prueba alfa de Cronbach fue de 0,94. La correlación intra-item no evidenció preguntas redundantes. El HAQ-UP-A mostró excelente correlación con HAQ-A (r = 0,93); FIHOA (r = 0.89) and Quick DASH (r = 0.91). También presentó buena correlación con DAS28-VSG (r = 0,68) y otros índices compuestos de actividad, así como con otros parámetros de la enfermedad. No se evidenció correlación del HAQ-UP-A con tiempo de evolución de la AR. La reproducibilidad del cuestionario fue de 0,82. La regresión lineal múltiple ajustada por edad y sexo mostró como principales determinantes del HAQ-UP-A a la evaluación global de la enfermedad por parte del paciente seguido por la presencia de rigidez matinal.
Conclusión: El HAQ-UP-A resultó ser confiable, válido y reproducible en pacientes con AR, constituyendo una herramienta útil en la evaluación de la capacidad funcional de los miembros superiores.
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Introduction

Rheumatoid arthritis (RA) is a chronic systemic disease of unknown origin. It is characterised by synovial membrane inflammation that causes swelling, pain and functional impotence in affected joints. The proper monitoring of patients with RA necessarily involves regular evaluation of different aspects of the disease, such as activity, function and structural damage. Numerous instruments have been developed over recent decades for this evaluation. In 1980 Fries et al.[1] developed the Health Assessment Questionnaire (HAQ). This is a self-reporting questionnaire that evaluates 5 areas: disablement, pain, adverse events, costs and mortality, and it is a very extensive tool that is hard to implement in everyday clinical practice. Different abbreviated versions of this questionnaire have been validated to evaluate functional deterioration in everyday practice: the Modified HAQ (MHAQ),[2] the Multidimensional HAQ (MDHAQ),[3] HAQ-II[4] and HAQ-DI[5] (Disability Index), are among the most outstanding versions. The latter is currently considered to be the gold standard for the evaluation of functional capacity in rheumatology, and it is widely used worldwide. The Argentine version of this index was validated in 2004 (HAQ-A).[6] It consists of 20 questions distributed in 8 categories, each one of which is evaluated using a 4-point Likert scale: 0 (performs the activity without difficulty) to 3 (cannot perform it). The highest score in each category determines the value of the same. The scores in each category are then averaged, giving a final result in the range from 0 (normal) to 3 (higher degree of disability).

The HAQ and its different versions evaluate functional disability in general and not that of any particular anatomical sector. In 1987 Baron et al.,[7] with the aim of evaluating the functional deterioration of the hand in elderly patients with osteoarthritis, used a modified version of the HAQ-DI which they called "HAQ-UP". To calculate this deterioration they considered the average scores for the categories that involve the upper limbs, such as dressing and washing, eating, reaching and grasping. This latter modification of the HAQ has not been validated in patients with RA. The high prevalence of upper limb involvement in this pathology[8–12] leads to a high impact on everyday life activities, as well as productivity at work; nevertheless, there are no suitable instruments in everyday medical care that would make it possible to detect the functional capacity of this anatomical sector. We therefore decided to undertake validation of the said questionnaire (which we denominate the *Health Assessment Questionnaire-Upper limbs Argentine version* [HAQ-UP-A]) in a cohort of patients with RA in Argentina.

Materials and methods

An analytical, observational, prospective and transversal study was undertaken. Consecutive patients over the age of 18 years old and diagnosed RA were included, according to the 2010 ACR/EULAR[13] classification criteria, who had visited the Rheumatology Department of the Hospital General de Agudos Dr. E. Tornú as outpatients. Patients with diagnoses of arthropathies other than RA were excluded, as were those with a history of traumatism and/or upper limb surgery and those who had pathologies other than RA which compromised the functionality of the upper limbs (such as soft tissue rheumatism, paresia, paralysis and thermal lesions, among others). Patients with the diagnosis of fibromyalgia were also excluded, as were those who had any condition which prevented them from reading or comprehending the questionnaires.

Demographic data were recorded: age and sex; disease characteristics: time of evolution in months, the presence and duration of morning stiffness in minutes, seropositivity for rheumatoid factor (RF) and anti-citrulinated protein/peptide antibodies (ACPA), the presence of subcutaneous nodules and evidence of erosion in X-ray images. Physical examination data were also recorded: there were 28 and 68/66 painful and swollen joints; laboratory parameters: erythrocyte sedimentation rate (ESR) in mm after one hour and C-reactive protein (CRP) in mg/dl. In each case the current treatment was described (non-steroid anti-inflammatory drugs [NSAIDS], corticoids, RA modifying drugs [RAMD], synthetics, biological therapies, others). The analogue visual scale (AVS) was used to measure pain and the overall evaluation of the disease by the patient and doctor. The following compound activity indexes were calculated: the Disease Activity Score 28 (DAS28-ESR),[14] the Clinical Disease Activity Index (CDAI),[15] the Simplified Disease Activity Index (SDAI)[16] and the Simplified Activity Index (SAI).[17] To evaluate their functional capacity the patients completed the following self-reporting questionnaires unassisted: HAQ-UP-A, HAQ-A, Functional Index for Hand Osteoarthritis (FIHOA)[18–20] and Quick-Disabilities of the Arm, Shoulder and Hand Score (Quick-DASH).[21–23] The HAQ-UP-A is composed of 10 questions from the HAQ-A which solely evaluate the functional capacity of the upper limbs (see Appendix A). To calculate the HAQ-UP-A the sum of the values obtained in each question and their subsequent average was obtained, determining a range of scores from 0 (no functional disability of the upper limbs) to 3 (the greatest disability of the same). In one group of patients a qualified occupational therapist undertook an objective evaluation of the functional capacity of the upper limbs by means of the Sequential Occupational Dexterity Assessment test (SODA-A).[24] The reproducibility of the questionnaire was determined in 30 patients who completed the HAQ-UP-A again

Table 1
Characteristics of the population and the disease.

Characteristic	RA (n = 100)
Women, n (%)	83 (83)
Age in years, average (SD)	57.9 (11.6)
Time of evolution in months, median (IQR)	81 (46.5–136)
RF, n (%)	97 (97)
ACPA, n (%) (n = 68)	64 (94.12)
Erosive, n (%)	77 (77)
Nodular, n (%)	26 (26)
Morning stiffness	
Present, n (%)	38 (38)
Duration in minutes, median (IQR)	20 (5–30)
DAS28-ESR, median (IQR)	3.99 (2.97-5.2)
HAQ-A, median (IQR)	.88 (0.25–1.5)
HAQ-UP-A, median (IQR)	.80 (0.2–1.3)
NSAIDS, n (%)	34 (34)
Corticosteroids, n (%)	62 (62)
RAMD, n (%)	89 (89)
Methotrexate	78 (87.7)
Leflunomide	24 (27)
Sulfasalazine	4 (4.5)
Hydroxychloroquine	1 (1.1)
Biological agents, n (%)	8 (8)

NSAIDS; non-steroid anti-inflammatory drugs; SD: standard deviation; RAMD: rheumatoid arthritis modifying drug; IQR: interquartile range.

from 10 to 15 days afterwards, having previously corroborated similar clinical and therapeutic conditions to the basal evaluation. Each patient accepted to take part in the study by signing an informed consent document. This informed consent as well as the research protocol were both approved beforehand by the Institutional Ethics Committee, following the guidelines of the Helsinki Declaration.

Statistical analysis

The characteristics of the population were described using averages, medians, absolute and relative frequencies, standard deviations (SD) and interquartile ranges (IQR). The level of confidence was measured using Cronbach's alpha test. Constructive validity was analysed using the Spearman correlation test with other functional capacity questionnaires and activity parameters. Reproducibility was established by test-retest. A lineal regression model was constructed with HAQ-UP-A as the results variable and the associated disease characteristics in the bivariate analysis. The median of HAQ-UP-A was compared between certain groups according to degree of disease activity according to DAS28 with the Kruskal-Wallis test.

Results

100 patients were included. 83% were women, with an average age of 57.9 years old (SD 11.6). The median time of evolution was 81 months (IQR 46.5–136). 97% were positive for RF, 94% were positive for ACPA and 77% had erosive disease. 38% of the patients had morning stiffness with a median duration of 20 min. (IQR 5–30). The DAS28-ESR median was 3.99 (IQR 2.97–5.22) and the HAQ-A median was 0.88 (IQR 0.25–1.50). 34% of the patients were treated using NSAIDS, 62% with steroids, 89% RAMD (84.7% methotrexate) and 8% with biological therapy (Table 1). The HAQ-UP-A was shown to be reliable (Cronbach alpha = 0.94) and intra-item correlation showed no redundant questions.

The HAQ-UP-A had excellent correlation with the HAQ-A (r = 0.93); with the FIHOA (r = 0.89); with the Quick-DASH (r = 0.91) and with the SODA-A (r = -0.84). It was also found to have a good correlation with the DAS28-ESR (r = 0.68) and the other compound activity indexes, as well as with other disease parameters (pain AVS and the overall AVS for the disease scored by the patient and doctor; NPJ and NSJ in the count of 28 and 68/66 joints). HAQ-UP-A was not found to be correlated to RA evolution time ($P = .81$) and it showed very low correlation with age ($P = .042$; r = 0.2) (Table 2). The reproducibility of the questionnaire amounted to 0.82. Age- and sex-adjusted multiple lineal regression showed that the main determinants of the HAQ-UP-A were the general AVS of the patient (beta = 4.009) followed by the presence of morning stiffness (beta = 3) (Table 3). Each 10 mm increase in the overall AVS of the patient produced an increase of the HAQ-UP-A by 0.077 points (CI 95: 0.038-0.12). When the HAQ-UP-A median was compared between groups determined by level of disease activity according to DAS28-ESR, it was found that it made it possible to distinguish between patients in remission and those with moderate activity ($P = .0005$) and high activity ($P < .0001$). The questionnaire also made it possible to distinguish between low and high levels of activity ($P < .0001$), as well as between moderate and high levels of activity ($P = .01$) (Fig. 1).

Table 2
Correlation of the HAQ-UP-A with functional capacity, activity and clinical variables of the disease.

Variable	R	*P*
HAQ-A	.93	<.0001
FIHOA	.89	<.0001
Quick-DASH	.91	<.0001
SODA (N = 15)	−.84	.0001
DAS28-ESR	.68	<.0001
CDAI	.65	<.0001
SDAI	.68	<.0001
SAI	.67	<.0001
Age (years)	.20	.042
Duration of evolution (months)	.02	.81
NPJ 28	.58	<.0001
NSJ 28	.44	<.0001
NPJ 68	.59	<.0001
NSJ 66	.46	<.0001
Pain AVS	.57	<.0001
General patient AVS	.63	<.0001
General doctor AVS	.54	<.0001

AVS: analogue visual scale; NPJ: number of painful joints; NSJ: number of swollen joints; r: Spearman's correlation coefficient.

Discussion

In this study we validated the HAQ-UP-A in a cohort of patients with RA in Argentina. This questionnaire was shown to be valid, reliable and reproducible, and it is a useful tool in the evaluation of the functional capacity of the upper limbs.

65%–90% of patients with RA have shoulder symptoms (principally pain), up to 45% show bilateral radiological damage and 75% mention symptoms that are compatible with rotator cuff involvement.[8,9] Likewise, up to 50% of patients show clinical or radiological involvement of the elbows. This joint has to work normally for suitable positioning of the hand, and it is crucial for performing everyday life activities (such as moving the hand up to the mouth). Loss of elbow function therefore causes an important limitation and it is considered to be even more incapacitating than the loss of normal shoulder or wrist movement.[10,11] The hand and wrist are involved in 28% and 8%, respectively, at the start of the disease; during the progression of the same it may be more than 90% affected, causing pain, limiting the range of joint movement and causing the loss of muscle strength.[12] Given the high prevalence of involvement of the upper limbs in patients with RA and the impact that this has on the performance of everyday activities and working productivity, it is vitally important to evaluate the functional capacity of this anatomical sector. Different instruments have been developed for this purpose, and self-administered questionnaires are the classic method used to evaluate functional

Table 3
Multiple lineal regression of the determinant characteristics of the HAQ-UP-A.

Model	Non-standardised coefficients		Standardised coefficients	*P*
	Beta	Standard deviation	Beta	
Male sex	−.2865	.123	2.33	.022
Age	.012	.004	3	.005
Morning stiffness	.314	.104	3.02	.003
General patient AVS	.008	.002	4	<.001
Corticoids	.17	.100	1.7	.092

AVS: analogue visual scale.

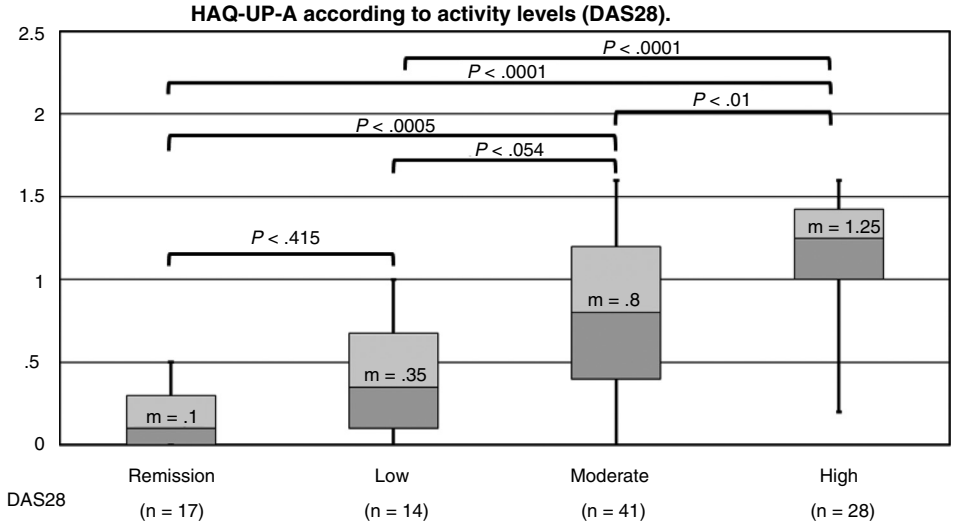

Fig. 1. HAQ-UP-A according to activity levels (DAS28).

capacity in rheumatology. These have made it possible to identify the impact of the disease on different aspects of life in patients with RA. They are an inexpensive tool and may be used at any level of complexity.

The DASH, like its abbreviated version Quick-DASH, was originally developed to measure the impact on upper limb functioning of different musculoskeletal pathologies.[21,22] It was subsequently validated in patients with RA, showing excellent correlation with the HAQ-DI and DAS28.[24] The complete version is composed of 30 questions, while its abbreviated version contains 11 questions. A Likert scale is used for evaluation, giving a final score by applying a mathematical formula. HAQ-UP-A has the advantage over this questionnaire of not requiring complex formulas for calculation.

The Michigan Hand Questionnaire (MHQ) is a questionnaire that was developed to evaluate the hand, and it contains 37 items in 6 domains: function, everyday life activities, pain, work, appearance and satisfaction.[19,25] It has been validated in patients with RA. Its disadvantages in comparison with the HAQ-UP-A are that it evaluates hand function in isolation and is a longer questionnaire.

The Cochin Hand Function Scale was originally developed to evaluate hand functional capacity in patients with AR.[19,26,27] It establishes the degree of difficulty in carrying out 18 everyday life activities. The main drawbacks of this questionnaire are that it solely evaluates the functional capacity of the hand and that it has not been validated for use in our population.

Nor have other questionnaires, such as the Arthritis Hand Function Test (AHFT)[28] and the ABILHAND[29] been validated in our population.

The Australian/Canadian Osteoarthritis Hand Index (the AUSCAN index)[30] was developed to measure functional deterioration of the hand in patients with osteoarthritis, and it has also been used to measure functional evolution in the hands of patients with RA. It comprises 15 items distributed in 3 categories: pain, stiffness and functioning. This questionnaire is longer and requires more complex calculation. It aims to isolate hand functioning and also requires a licence for to be used.

The HAQ-A is widely accepted by the medical community as well as by patients, so that we consider it to be highly useful to dispose of a modification of the same that makes it possible to specifically evaluate the functional capacity of this anatomical sector. The HAQ-UP-A shows excellent correlation with disease activity, and its main determining factors were overall evaluation of the disease by the patient, followed by the presence of morning stiffness. In the Argentine validation of the HAQ-DI the main determining factors in the questionnaire in multiple lineal regression were the AVS for pain and the duration of morning stiffness,[5] the latter of which coincides with our findings. Although we do not establish how long it takes to complete, in the work to validate the HAQ-A it took an average of 5 min. to complete the questionnaire[6]; we therefore conclude that as it contains half the number of items, it will take less time to complete. In our work we have not established the sensitivity to this change, and this evaluation is left for future studies.

Conclusion

The HAQ-UP-A is reliable, valid and reproducible, and it is a useful tool for detecting the functional capacity of the upper limbs in patients with RA.

Conflict of interests

The authors have no conflict of interests to declare.

Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at https://doi.org/10.1016/j.reumae.2019.01.001.

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