

# MAPPING FROM THE HEALTH ASSESSMENT QUESTIONNAIRE (HAQ) TO THE EQ-5D-5L QUESTIONNAIRE IN PATIENTS WITH RHEUMATOID ARTHRITIS

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## OBJECTIVE

Rheumatoid arthritis (RA) is a chronic and systematic inflammatory disease associated with progressive joint destruction, which may lead to significant disabilities causing a significant decrease in health-related quality of life (HRQoL). Therefore, studies of treatment efficiency, usually based on health utilities are of great interest.

The EQ-5D-5L is one of the most widely used generic questionnaire to derive these utilities (www.euroqol.org). However, in clinical practice, the use of specifics questionnaires is more frequent.

Our objective was to develop mapping functions to estimate the EQ-5D-5L utility index from the specific Health Assessment Questionnaire (HAQ).

### METHODS

Design: prospective observational study.

**Patients:** n = 103 patients from Spain with RA, with a 6 month followup (n = 95).

#### Instruments:

- EQ-5D-5L: based on the developed preference-based scoring function in Spanish population (Ramos-Goñi et al. 2016), the utility index is derived. It ranges from 0 (death) to 1 (fully healthy life), with negative values for states worse than death (range: -0.4162 to 1).
- HAQ: based on 20 items, the HAQ Disability Index range from 0 to 3, with higher scores indicating worse health status.

**Derivation of mapping function:** baseline data was used to derive the mapping functions from HAQ Disability Index.

- Modelling strategies: linear, tobit and beta regression models.
- Selection of the preferred model: different models were considered, including HAQ index, powers, and sex and age. To select the best model in each strategy the AIC, BIC and adjusted R<sup>2</sup> were used.

Predictive performance: models were compared by MAE and RMSE.

Validation of mapping function: the follow-up data was used.

Histogram of EQ-5D-5L index

Model fit: compared by the MAE, RMSE and ICC.



derivation sample (n = 103)

## RESULTS

Descriptive of the EQ-5D-5L index at baseline (Figure 1):

Mean = 0.715; SD = 0.232; Range = [-0.297, 1]; Ceiling effect = 9.71%

Derivation of mapping function: see Table 1

- The preferred models for each strategy included HAQ+HAQ<sup>2</sup> for linear model, and only HAQ for tobit and beta regression models.
- Linear model obtained the lowest MAE and RMSE values, and beta model the highest adjusted R<sup>2</sup>.

Validation of mapping function: see Table 2

• Linear model showed the lowest MAE and RMSE, and the highest ICC, followed by the beta model.

Selected function: based on the linear model.

 $EQ-5D-5L = 0.9067 - 0.1345 \cdot HAQ - 0.1652 \cdot (HAQ^2/3)$ 

# Table 1. Fit measures for the derive mapping functions in the derivation sample (n = 103)

	Linear model	Tobit model	Beta model
	$HAQ + HAQ^2$	HAQ	HAQ
Mean	0.715	0.726	0.703
SD	0.176	0.188	0.164
Range	0.226 to 0.907	0.292 to 0.970	0.152 to 0.907
Adj. R <sup>2</sup>	0.5667		0.5724
MAE	0.1065	0.1083	0.1100
RMSE	0.1505	0.1542	0.1505

SD: Standard deviation; MAE: Mean absolute error; RMSE: root mean square error.

## Table 2. Descriptive and fit statistics of mapping functions in the validation sample (n = 95)

	Linear model	Tobit model	Beta model
	$HAQ + HAQ^2$	HAQ	HAQ
Mean	0.715	0.725	0.704
SD	0.173	0.185	0.174
Range	0.121 to 0.907	0.225 to 0.970	0.107 to 0.889
MAE	0.0968	0.1029	0.1004
RMSE	0.1273	0.1326	0.1289
ICC	0.7568	0.7532	0.7526

SD: Standard deviation; MAE: Mean absolute error; RMSE: root mean square error; ICC: intraclass correlation coefficient.

## CONCLUSIONS

To the best of our knowledge, this is the first mapping function from the HAQ questionnaire to the Spanish EQ-5D-5L utility index, in patients with RA. It could be a very useful tool for clinicians and researchers when cost-effectiveness studies are needed in these patients, and generic HRQoL instruments to derive utility indexes are not available.

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