The Challenge of Measuring Quality of Life in Huntington's Disease

MSR158

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Background

- Huntington's Disease (HD) is a rare genetic disorder that leads to the gradual degeneration of nerve cells in the brain, impacting motor skills, cognitive functions, and behaviour. As there is currently no cure, managing HD involves a comprehensive approach that includes both medication and various non-drug therapies.
- Health-related quality of life (HRQL) is a crucial metric for both patients and healthcare providers. However, the subjective nature of Quality of Life (QoL), combined with the progressive cognitive symptoms that can hinder questionnaire completion, presents a significant challenge for its continuous measurement.
- By using proxy-reported measures, researchers, caregivers, and clinicians can continue to assess QoL of HD patients when they are no longer able to complete questionnaires themselves.
- Previous studies have effectively employed the Rasch methodology with proxy questionnaires to reliably measure HRQL in individuals with dementia.
- Test equating methodology offers an analytical framework that allows both the original and proxy measures to be aligned on the same scale, assuming that caregivers and patients are reporting on the same theoretical construct. A crosswalk table can then be used to estimate the equivalent self-reported score when only the proxy measure is available. This approach provides a meaningful way to track the QoL of individuals with HD over time.

Aims

- **Develop robust self-reported (HDmQoL) & proxy (HDmQoL-p) QoL measures** for individuals with HD.
- Examine whether self-reported & proxy measures reflect the same **theoretical construct** and can be aligned on the same scale.
- Create a **crosswalk table** to estimate a patient's self-reported score based on their proxy measure.

Methods

The data presented comes from HD patients and their caregivers in the UK. These results are based on a partial dataset, as recruitment is still ongoing in the UK, Germany, Czechia, and Italy. The 49-item questionnaire, available in both self- and proxy-reported formats, was developed from in-depth, qualitative interviews and completed by HD patients and their caregivers. Rasch measurement theory was used to create the HDmQoL and HDmQoL-proxy measures. Test equating methodology, using common items, was applied to assess the comparability of both measures and to generate a crosswalk table.

Results

Table 1. Summary results for item trait tests & reliability of final models for HDmQoL, HDmQoL-p and HDmQoL+HDmQoL-p.

	Item trait interaction test			No. of items	Reliability
	Chi-sq	DF	p-value		PSI
HDmQoL	49.6	50	0.488	25 items	0.885
HDmQoL-proxy	22.1	34	0.942	17 items	0.83
HDmQoL+ HDmQoL-proxy*	69.0	62	0.240	31 items (11 common)	0.856

Example questionnaire items

Included in the final pool of items (common item):

HDmQoL: ***I can only concentrate on one task at a time***

HDmQoL-proxy: ***They can only concentrate on one task at a time***

Removed due to misfit:

I don't like to tell people I have Huntington's

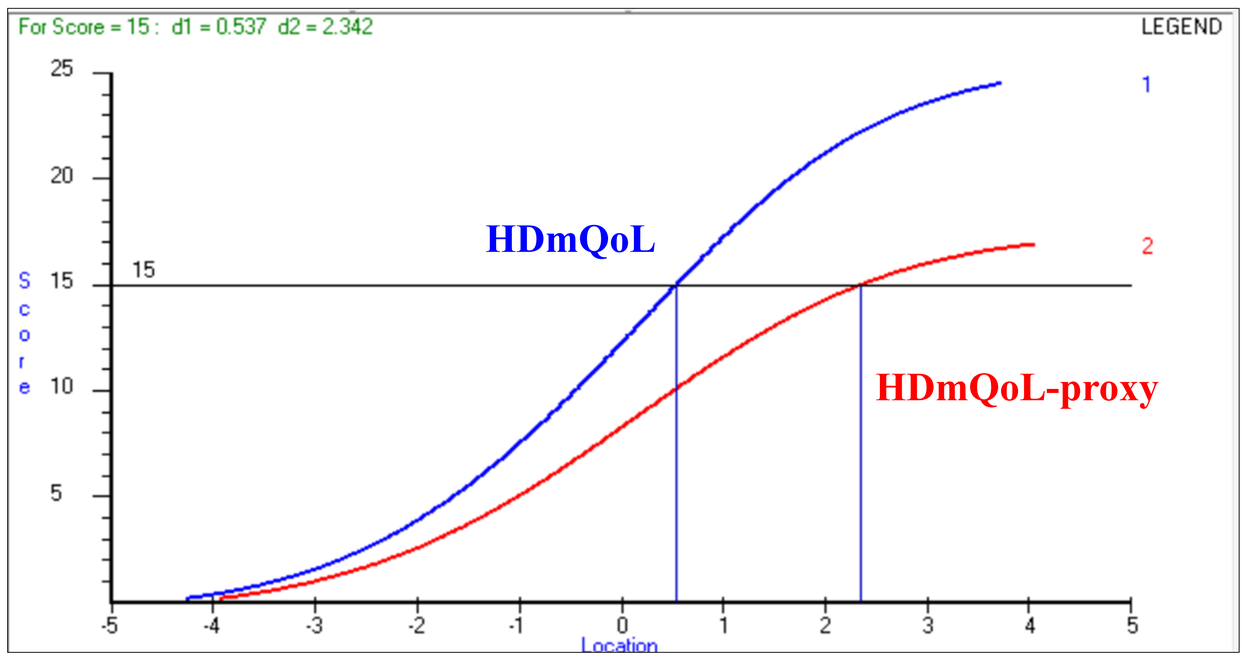

Figure 1. Relationship between raw scores transformed into Rasch measures

For patients with a raw score of 15 on HDmQoL the Rasch measure is 0.537 logits. For the same raw score on HDmQoL-proxy the equivalent Rasch measure of QoL is 2.342.

- Currently, data is available from 62 HD patients (50% female; median age 60 years, 82% living with a spouse/partner) and 52 caregivers (61% female; median age 62 years; median disease duration: 8.5 years) residing in the UK.
- The data analysis was conducted in two stages. Stage 1: Self-reported and proxy-reported items were analysed using the Rasch framework. Several well-established statistical tests were applied to identify specific items in both questionnaires that were not functioning as intended.
- The tests applied included: data-model overall fit test, examination of individual item fit residuals, local dependency test, differential item functioning (DIF) analysis (considering age, sex, relationship, and years since HD diagnosis), unidimensionality test, Person Separation Index (PSI), and assessment of test targeting. These procedures helped identify and eliminate misfitting items in both questionnaires.
- This process resulted in robust HDmQoL and HDmQoL-proxy measures, comprising 25 and 17 items respectively, with 11 items common to both questionnaires. The results of the item-trait interaction test and the reliability measure by PSI for the final models of HDmQoL and HDmQoL-proxy are presented in Table 1.
- Stage 2: The datasets from both questionnaires were combined (vertically, with some cases appearing twice) and analysed using the Rasch framework.
- A total of 31 items were included in the model (HDmQoL: 14 unique and 11 common items; HDmQoL-proxy: 6 unique and 11 common items). The model estimates were anchored by the HDmQoL responses to the common items. Diagnostic tests applied to the results indicated a satisfactory data-model fit (Table 1).
- DIF analysis considered whether responses were provided by an HD patient or a caregiver (proxy). None of the common items showed any DIF issues.
- The unidimensionality test comparing estimates from both measures did not reveal significant differences. One item showed DIF based on whether the patient lived with a partner or had a different living situation. The remaining tests suggested a good data-model fit, indicating that HDmQoL and HDmQoL-proxy can be placed on the same Rasch continuum, thus validating the preparation of the crosswalk table.

Conclusions

- **Rasch measurement theory was employed to develop two new QoL measures for HD patients; self-reported and proxy.**
- **The results indicate that both instruments are suitable for assessing the QoL of patients living with HD as well as allowing continuous assessment of QoL across the course of the disease.**

Limitations

The current participant sample is small and based on partial data, recruitment is still open. Once data collection is completed (estimated 250), the above conclusions can be reaffirmed.

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