Results of the Rasch analysis in the development of a specific Health Related Quality of Life questionnaire for home enteral nutrition: the NutriQoL® questionnaire

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Introduction

Generic instruments measuring Health Related Quality of Life (HRQoL) are not enough concrete in order to explore the influence of specific aspects of home enteral nutrition (HEN) in patients receiving this therapy. For this reason, a specific questionnaire, NutriQoL®, that would allow assessing the HRQoL of HEN, has been developed independently of the underlying pathology and the route of administration. Rasch analysis makes possible to select the items that are independent of the ability of people to respond to them and the difficulty of the items.1,2

Objective

To describe the steps in selecting items in the last version of the NutriQoL® questionnaire when applying the Rasch analysis.

Methods

We conducted a pilot study in which the first version of the NutriQoL® questionnaire (44 items + Visual Analogue Scale) was submitted to patients (or main caregiver) that had been under HEN for at least 1 month. Rasch Analysis and the Differential Item Functioning (DIF) were applied to finally obtain an item selection that was independent of the underlying pathology and the route of administration. DIF is checked comparing Rasch analysis results carried out in each subgroup determined by the kind of pathology and route of administration. Adjustment of the data obtained in the application of the Rasch model is calculated with statistics based on the residuals (differences between expected and observed responses).

Results

► The preliminary version of NutriQoL® was administered to 141 patients and 24 caregivers. Out of participants, 63.4% were men. The mean age (SD) was 69.63 (15.17). By age range, the majority of patients were over 55 years.
► The mean (SD) of the sample for the Charlson and Karnofsky index was 3.2 (2.4) and 70.4 (16.9) respectively. The mean (SD) for the Pfeiffer test was 0.54 (1,39).
► 56.4% patients had been on HEN for 1-6 months and used it as nutritional supplement (Figure 1).
► The primary diagnosis for which HEN was prescribed was neoplastic disease (56.3%, p<0.05) (Figure 2).
► The majority of patients only used the oral administration route (55.8%) (Figure 3).
► The preliminary version of NutriQoL®, consisting of 43 items specific quality of life for HEN (5 options response (Table 1)), 1 item of current quality of life (not included in the Rasch analysis), and a Visual Analogue Scale (VAS).
► Four items were removed that items scored 50% or higher response rate in the “does not apply to my current situation”.

Rasch analysis results: items elimination

► First Rasch analysis carried out showed response probability curves whose results denoted the existence of redundant categories (Figure 4). To solve this problem, response categories “sometimes” and “usually” were unified.
► A new Rasch analysis was conducted and 7 items still showed response categories unordered in their curves of probability, then these 7 items were removed from the questionnaire.
► In the 32 remaining items a DIF analysis was conducted in groups according to underlying disease and the route of administration, items that showed a differential behavior, i.e. items whose graphical representation was outside the confidence interval were eliminated (11 items) (Figure 5).
► A new Rasch analysis was made (21 items). The goodness of fit of the items to the Rasch model is quantified by mean residue called infit and outfit, which ensure the adequacy of the questionnaire to measure the construct of interest. Those items whose infit and outfit values exceeded the criteria [interval (-2, 2)] were removed from the questionnaire (Figure 6).
► Rasch analysis was performed with the items that were incorrectly set in the previous step. Another 4 items were removed from the questionnaire.

Rasch analysis results: NutriQoL® final version

► NutriQoL® was reduced to 17 items in addition to initial single item and a Visual Analogue Scale:

1. HRQoL overall evaluation:
   - Global evaluation of the quality of life of the patient under HEN (initial single item)
   - Visual Analogue Scale (VAS): score for patient assessment of HRQoL in the present (scale 0-100).
2. Evaluation of specific aspects of HRQoL in people under HEN (17 items) distributed in two dimensions:
   - Physical functioning and activities of daily living: meal times, mobility, usual activities, sleep quality, etc.
   - Aspects of social life: social activity limitation, relationship with friends.

Conclusions

Rasch analysis has allowed the development of NutriQoL®: a brief and simple questionnaire to measure impact of HEN in patients’ HRQoL that can be self-administered by themselves or their caregiver. Rasch analysis has allowed to select items independently of the patients’ underlying pathology and HEN’s route of administration, regardless of the ability to respond to them and the own item difficulty. So the NutriQoL® questionnaire provides a specific way to identify the most important dimensions of patients’ HRQoL that are subject to modification as a consequence of HEN.

Tables and Figures (I)

Table 1. Options Response Questionnaire items NutriQoL® under Rasch Analysis

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<thead>
<tr>
<th>Category</th>
<th>Item</th>
<th>Autonomy</th>
<th>Oral and nasogastric intubation</th>
<th>Oral and ostomy</th>
<th>Intermittent</th>
<th>Nutritional suplement</th>
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<td>Activities of daily living</td>
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<tr>
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<td>Meal times</td>
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<tr>
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References


Sponsored by: Nestlé Health Science