



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 (HRQL) 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 HRQL 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

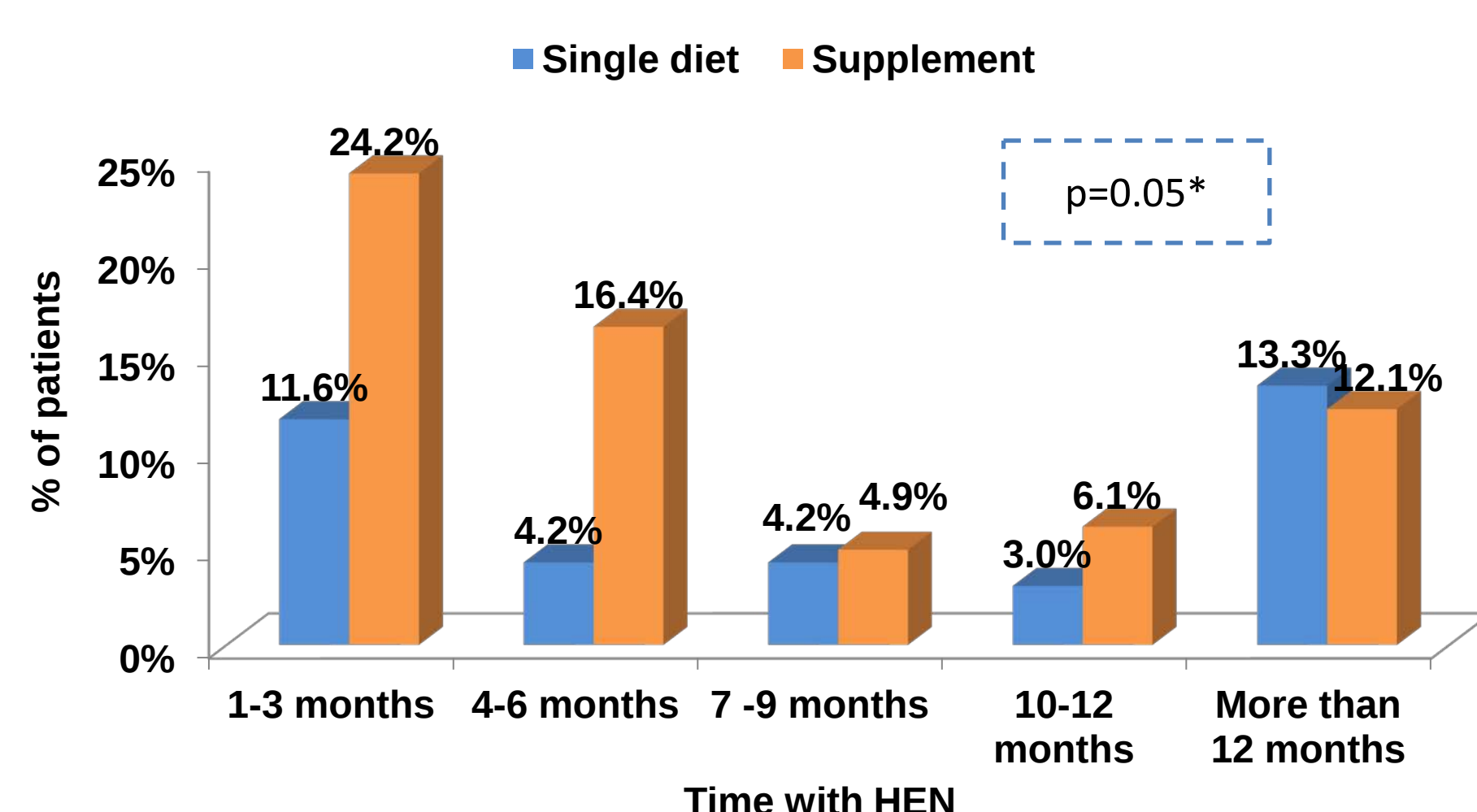
We conducted a pilot study in which the first version of the NutriQoL® questionnaire (44 items + Visual Analogue Scale) was submitted to patients (or main caregiver) that had been under HEN for at least 1 month. Rasch Analysis and the Differential Item Functioning (DIF) were applied to finally obtain 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).

Tables and Figures (I)

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

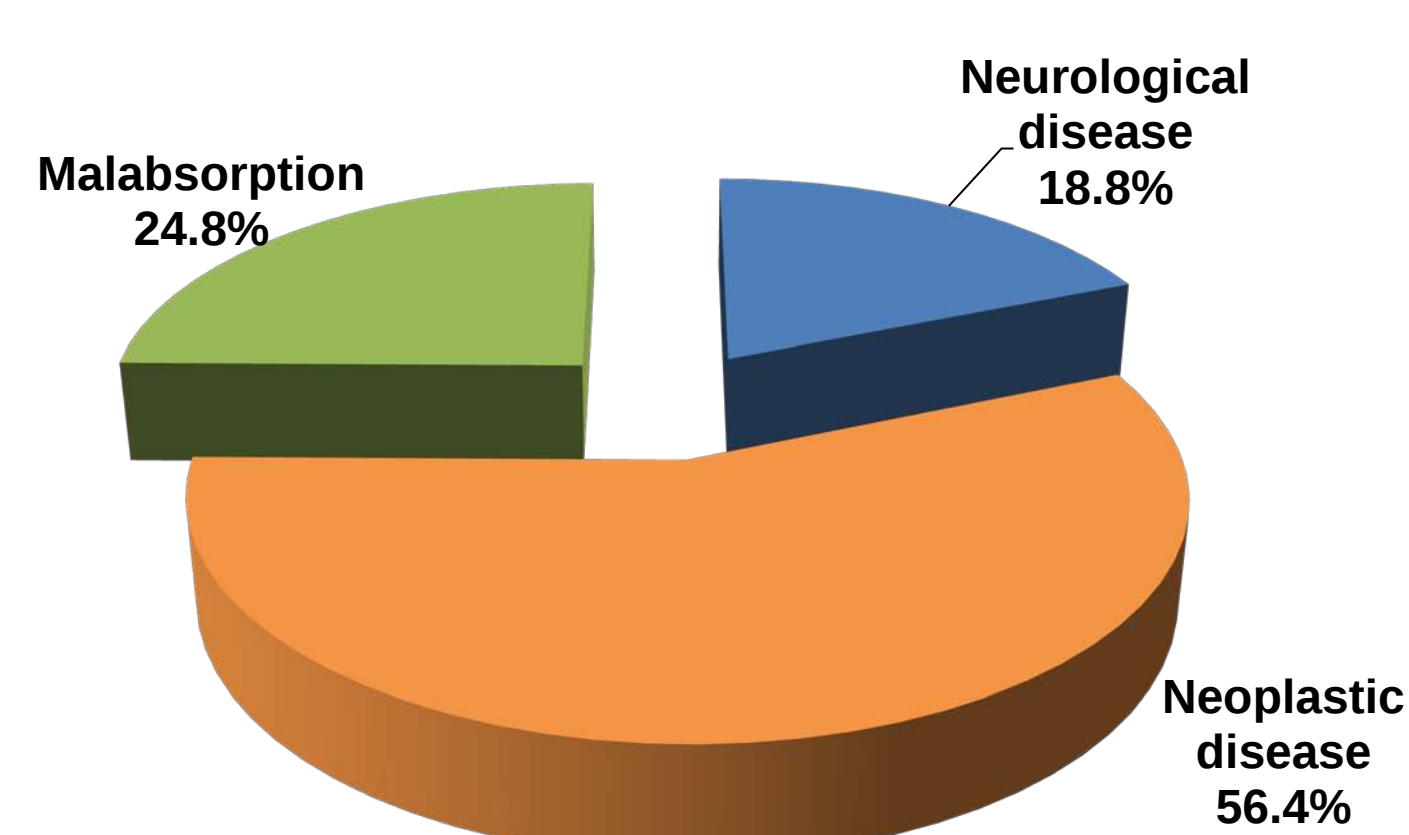
Never // Sometimes // Usually // Always // Does not apply to my current situation

Figure 1. Distribution of patients by time with HEN.



* p-value corresponds to Chi-square homogeneity test.

Figure 2. Distribution of patients according to the disease for which they receive HEN



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 60.63 (15.17). By age range, the majority of patients were over 55 years.
- ▶ The mean (SD) of the sample for the Charlson and Karnofsky 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.

References

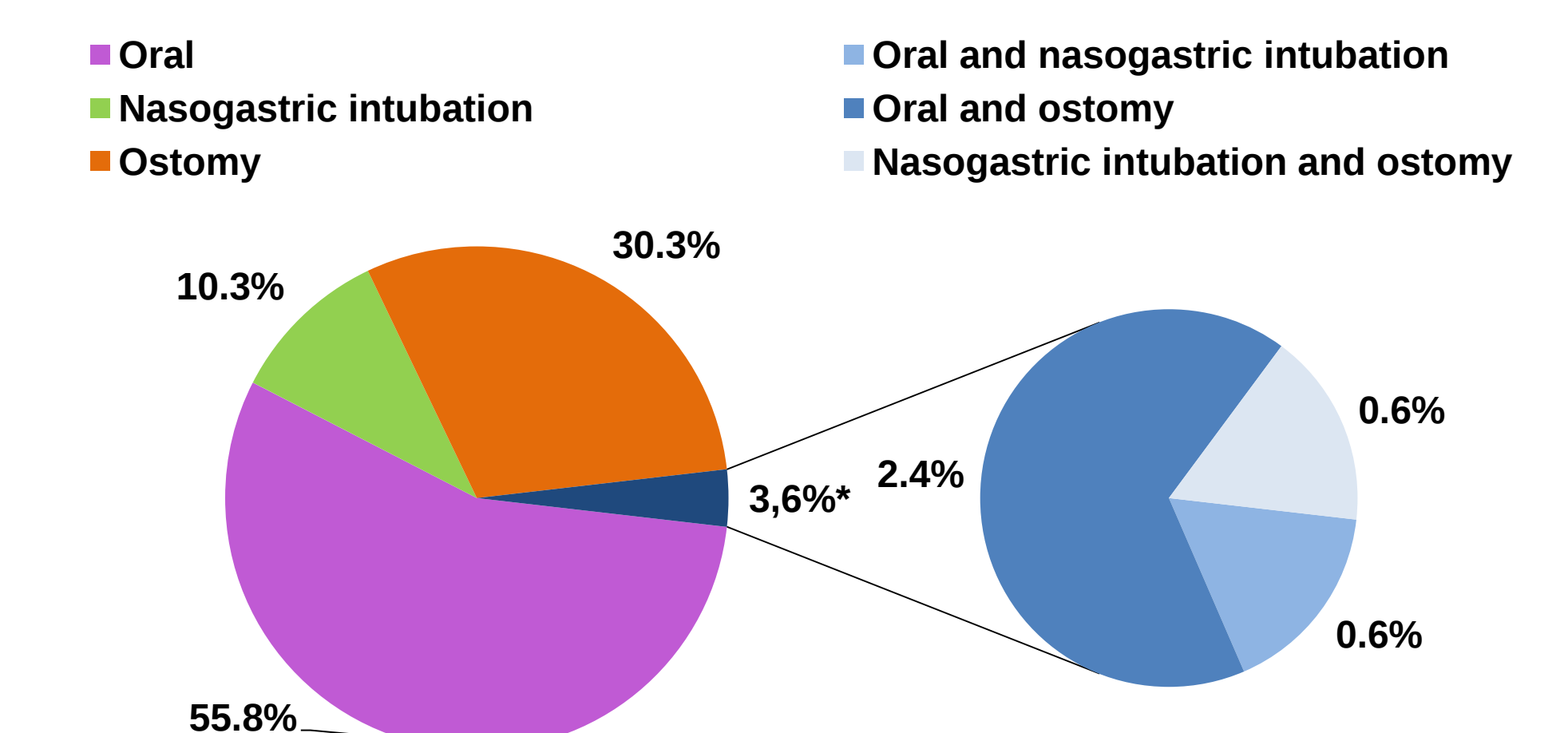
- Prieto L, Alonson J, Lamarca R, Wright BD. Rasch measurement for reducing the items of the Nottingham Health Profile. J Outcome Meas 1998; 2:285-301
- Prieto L, Thorsen H, Juul K. Development and validation of a quality of life questionnaire for patients with colostomy or ileostomy. Health and Quality of Life Research 2005; 3:62 Available at <http://www.hqlo.com/content/3/1/62>. Access on September 3th 2010.

Conclusions

Rasch analysis has allowed the development of NutriQoL® a brief and simple questionnaire to measure impact of HEN in patients' HRQL 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 people 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' HRQL that are subject to modification as a consequence of HEN.

Tables and Figures (II)

Figure 3. Distribution of patients according to administration route



*3.6% is the addition of the administration routes percentages: oral and ostomy, oral and nasogastric intubation, and nasogastric intubation and ostomy.

Figure 4. Example of characteristic curves of difficulty levels corresponding to two questionnaire items (a. indicates item with redundant categories. b. indicates item with appropriate categories).

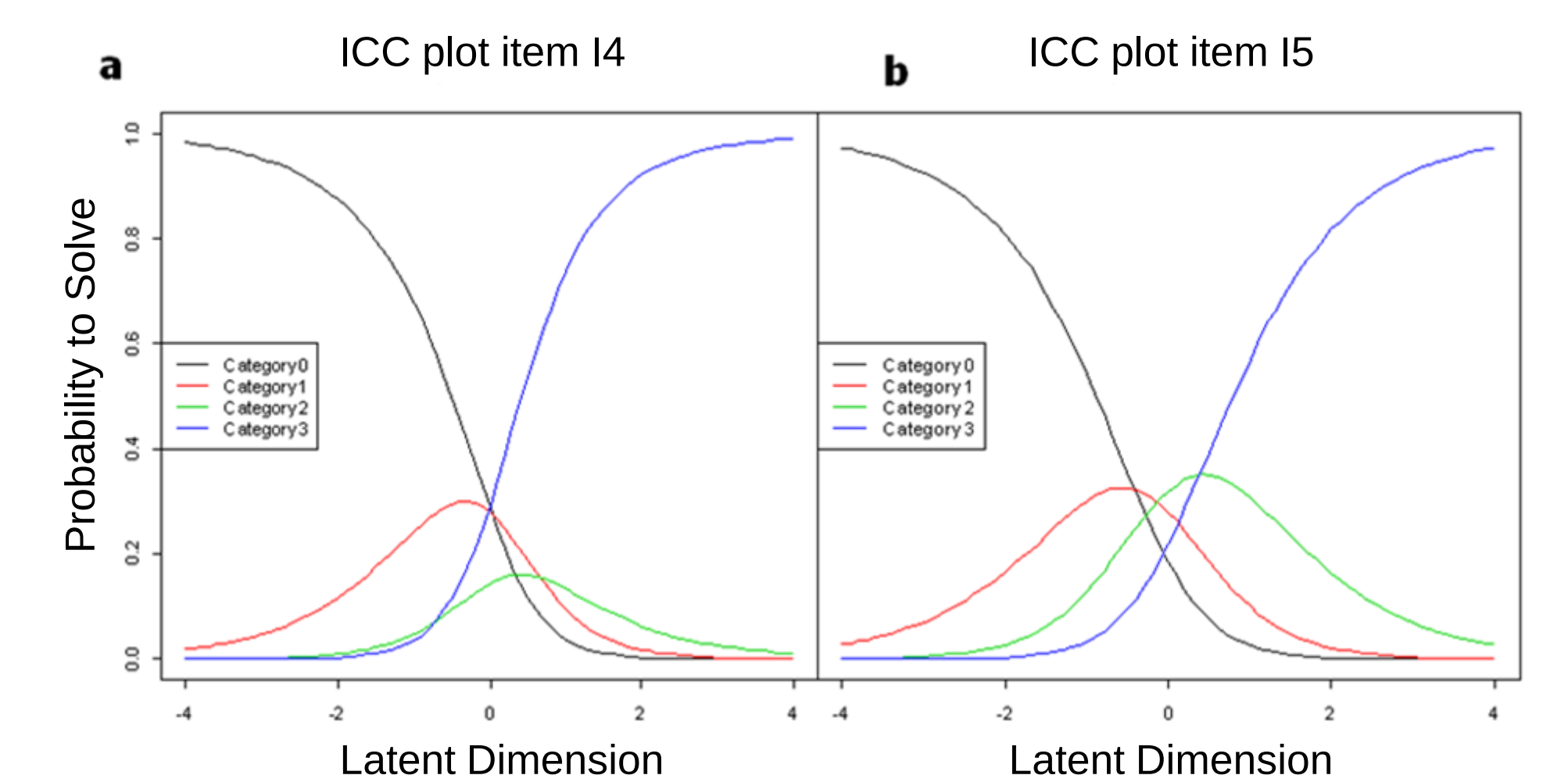


Figure 5. Example of interval estimates of oncologic disease vs malabsorption and others. Item 35 showed a differential behavior

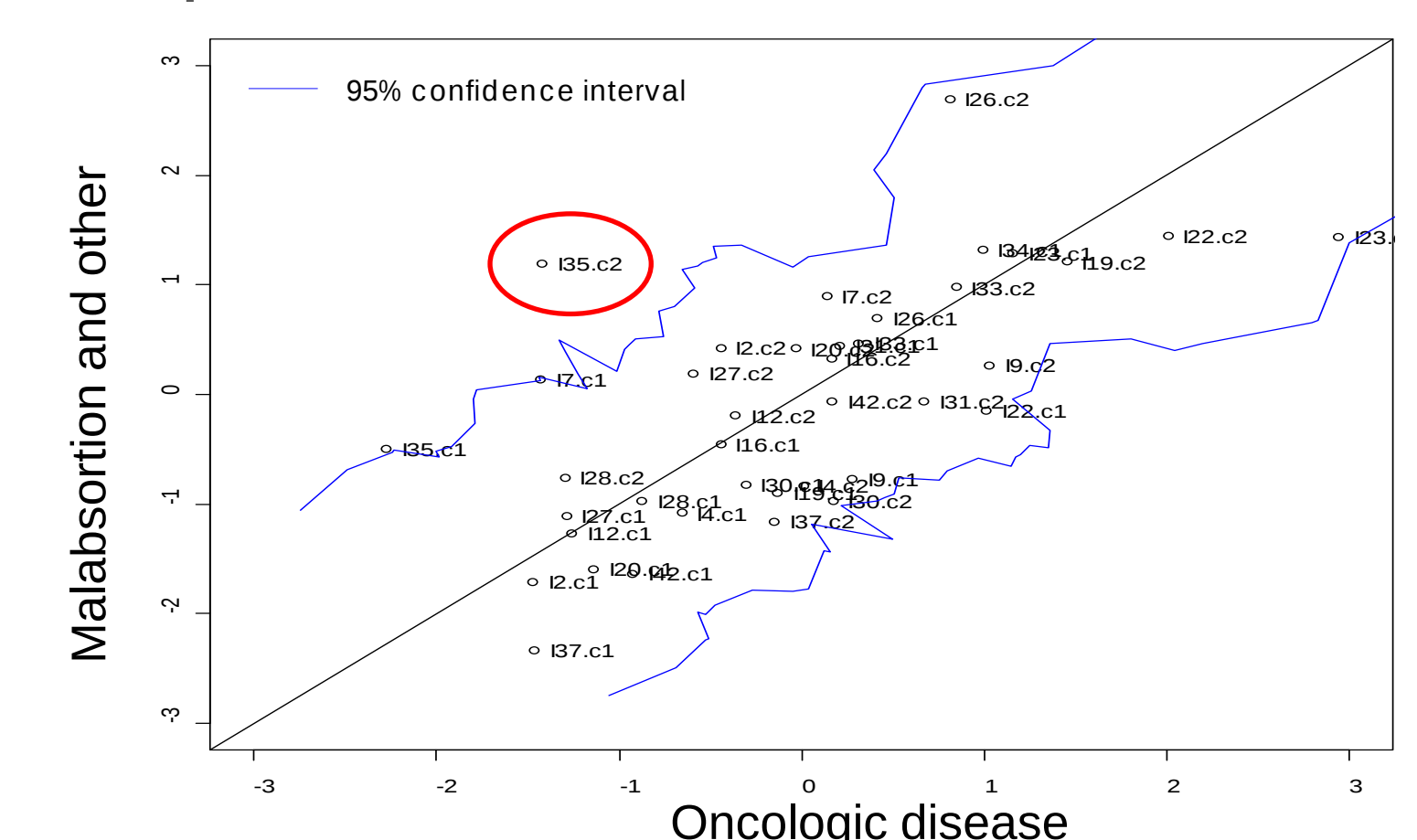


Figure 6. Representation of the items regarding to the statistical infit

