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Factors Influencing Responsiveness and Interpretability of the Roland-Morris Disability Questionnaire

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Background: Responsiveness and interpretability are important measurement properties, to enable clinicians to interpret the clinical relevance of score changes following an intervention period. Recently, an expert panel reported wide variations in design and methods used to estimate Minimal Important Change of the Roland-Morris Disability Questionnaire (RDQ) (Ostelo et al., 2008). The purpose of this study was to assess the impact that several parameters (interpretation of the global perceived effect (GPE) scores and baseline scores) have on RDQ responsiveness and interpretability indicators.

Methods: The population consisted of 223 participants of a randomized controlled trial concerning the effectiveness of rehabilitation for patients with non-specific chronic low back pain (LBP) (Smeets et al., 2006). Participants were randomized to one of three active treatments or a waiting list for 10 weeks. RDQ was administered before (T1) and at the end (T2) of the intervention or control period. At T2, patients were also asked to score the change in their limitations due to LBP compared to T1 using the following GPE scale: 1=worse than ever, 2=much worsened, 3=slightly worsened, 4=unchanged, 5=slightly improved, 6=much improved, 7=completely recovered. Interpretability and responsiveness indicators used in this study were:- SEMagreement (based on variance between measures and the residual variance).- MDC (minimal detectable change) calculated as: $1.96 \times \text{root square of } 2 \times \text{SEM}$. - ROC parameters. The area under the curve (AUC), reflecting the ability of the test to discriminate between subjects who have improved from subjects who are unchanged, was calculated. The optimal cut-off (OC) point for which sensitivity and specificity jointly minimize the total error in misclassification, was also estimated. Interpretation of the GPE was investigated by clustering the GPE scale in different ways to know whether or not considering patients reporting slight changes as “unchanged”, influences responsiveness indicators. The whole sample was also stratified into 2 groups (RDQ scores = 13 or less versus 14 or more) and into 3 groups (tertile distribution) to look at influence of baseline scores clustering.

Results: Data of 212 patients included in the trial could be analysed. SEMagreement, MDC, OC point and the AUC values were similar when considering subjects in category “3-4” or “4” as unchanged. The OC point of the RDQ was found to be 1.5; however, when patients from the category 3, 4 and 5 were considered as unchanged the OC point became much higher (3.5 with Sens = 0.804 and Spec = 0.846). RDQ baseline scores did not influence MDC whereas the OC point and the sensibility and/or specificity differed between groups. We also observed an influence of the way the baseline scores are used to cluster patients on the ROC parameters. For example, when using the median split of 13 to categorize patients, the optimal cut-off score is 1.5 for patients with a baseline RDQ score of 13, while this would be 4.5 while using the three categories based on tertile scores.

Conclusions: Our study confirms the influence of the interpretation of the GPE. Baseline scores and the way to cluster patients with regard to their scores also influence interpretability and responsiveness parameters.