

# Evaluation of PROMIS CAT Mobility Physical Function Score in the follow up of Perthes' disease and Slipped Capital Femoral Epiphyses

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## BACKGROUND

- The Patient-Reported Outcomes Measurement Information System (PROMIS) has shown to be a better PROM compared to currently used (legacy) PROMs – mostly in adult orthopaedics.<sup>(1)</sup>
- Legg-Calvé-Perthes Disease (LCPD) is an avascular necrosis of the hip, that may lead to premature osteoarthritis. Slipped Capital Femoral Epiphyses (SCFE) is akin to a fracture through the femoral head growth plate, resulting in a displaced hip.
- PROMIS has not been examined in the long-term follow up of these patient groups.

## AIMS

Assess PROMIS compared to currently used PROM scores in the long-term follow up of patients with LCPD and SCFE by;

- (1) Correlating PROMIS-CAT Mobility and a legacy score; Non-Arthritic Hip Score (NAHS). Also correlated were quality of life via EQ-5D-5L, and pain via the Numeric pain Rating Scale (NRS) - via Spearman Rank Correlation Coefficient ( $r_s$ ).
- (2) Assess floor and ceiling effects of each score (>15% of participants with either the lowest or highest score).<sup>(2)</sup>

## METHOD

- Each participant would complete each PROM score; as an online Computer Adaptive Test (CAT) in the case of PROMIS, or via post or phone-call for the other PROMs depending on participant preference (Figure 1).
- All statistical analysis was undertaken with IBM SPSS Statistics 26.

## RESULTS

- 291 patients (252 with LCPD, 39 with SCFE) completed all scores from Nov. 2017 to Jun. 2019. The mean age and SD of participants was  $28.19 \pm 12.46$  years (range, 12-58 years).
- PROMIS showed strong correlations with all scores ( $r_s$  values are shown in Figures 2, 3 and 4). All correlations were significant at  $p < 0.01$  (2-tailed).
- Ceiling effects were seen in all scores, except the NRS, showing only a floor effect (Figure 5). The greatest ceiling effect was in PROMIS at 41.2%, and the lowest in the NAHS at 19.6%.
- There was also a gap in the distribution of PROMIS scores at the higher end, with no participant scoring between T-scores of 54.2 and 60.1, but 120 of 291 scoring 60.2 (highest score possible)
- The minimal detectable change (MCD) of the NAHS is 10.<sup>(3)</sup> PROMIS was unable to distinguish between differences of 10 in the NAHS score range of 82 and 100 – suggesting it may not incorporate all the elements of assessment that this legacy score uses.

Figure 1 – Histogram of ceiling and floor effects of each score

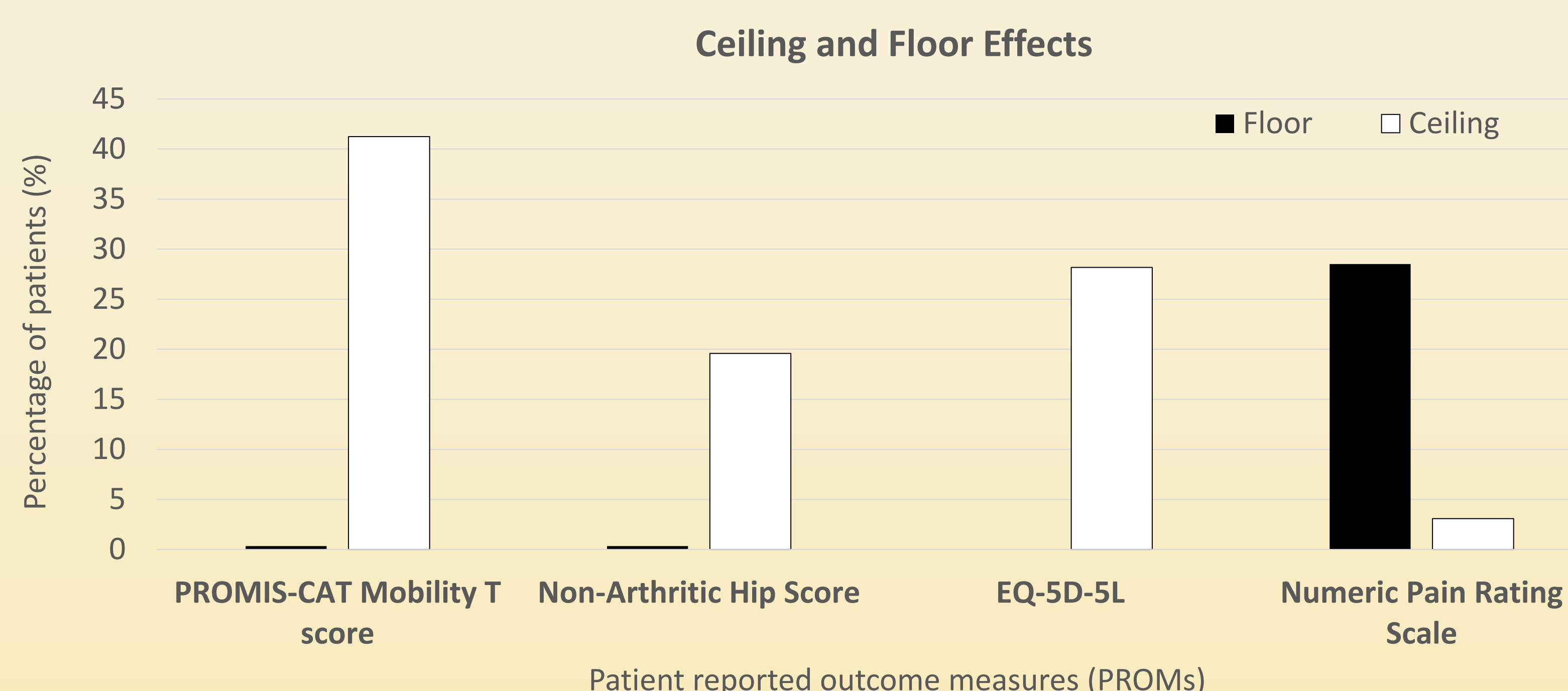


Figure 2 – Scatter plot of PROMIS vs NAHS

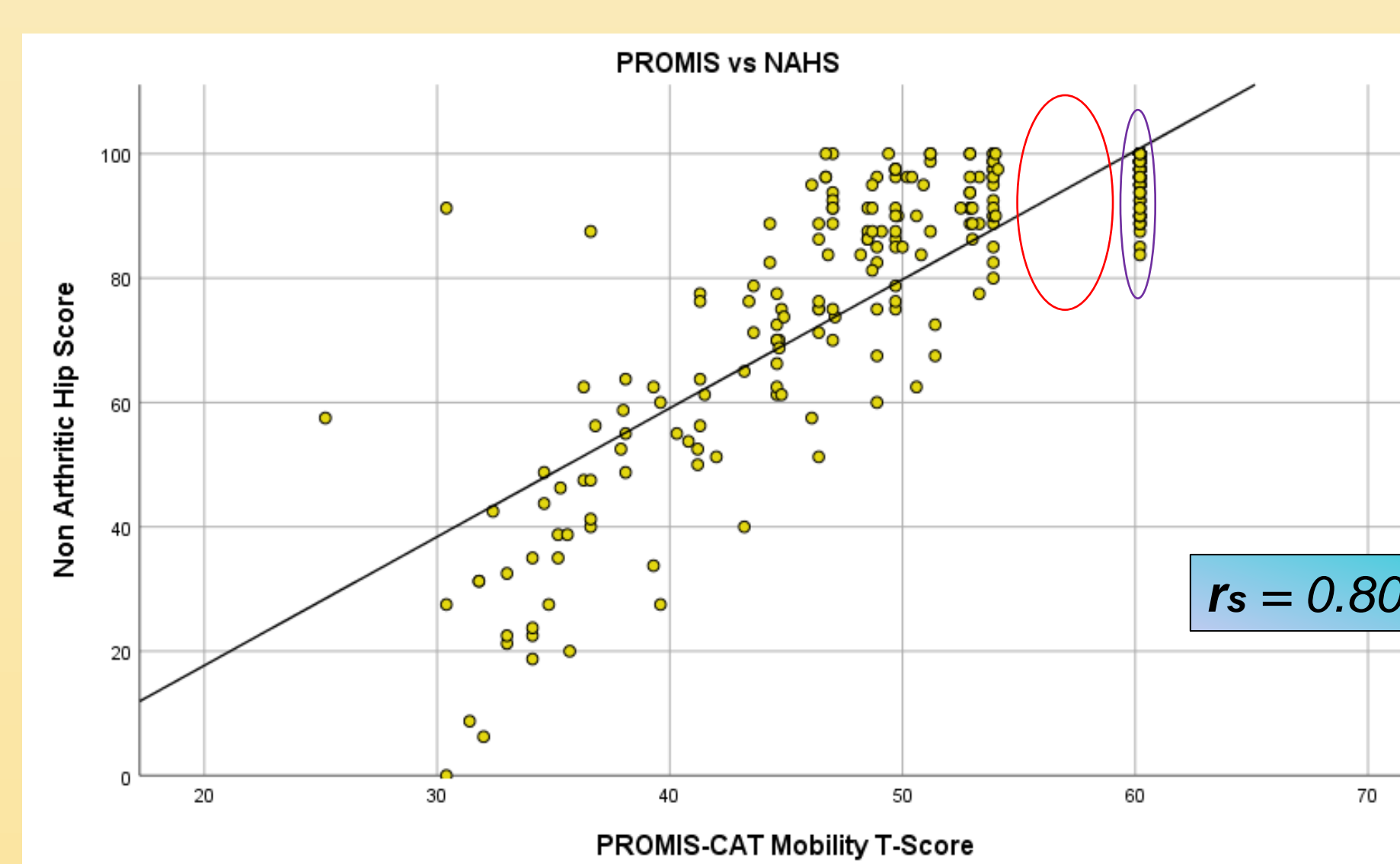


Figure 3 – Scatter plot of PROMIS vs EQ-5D-5L

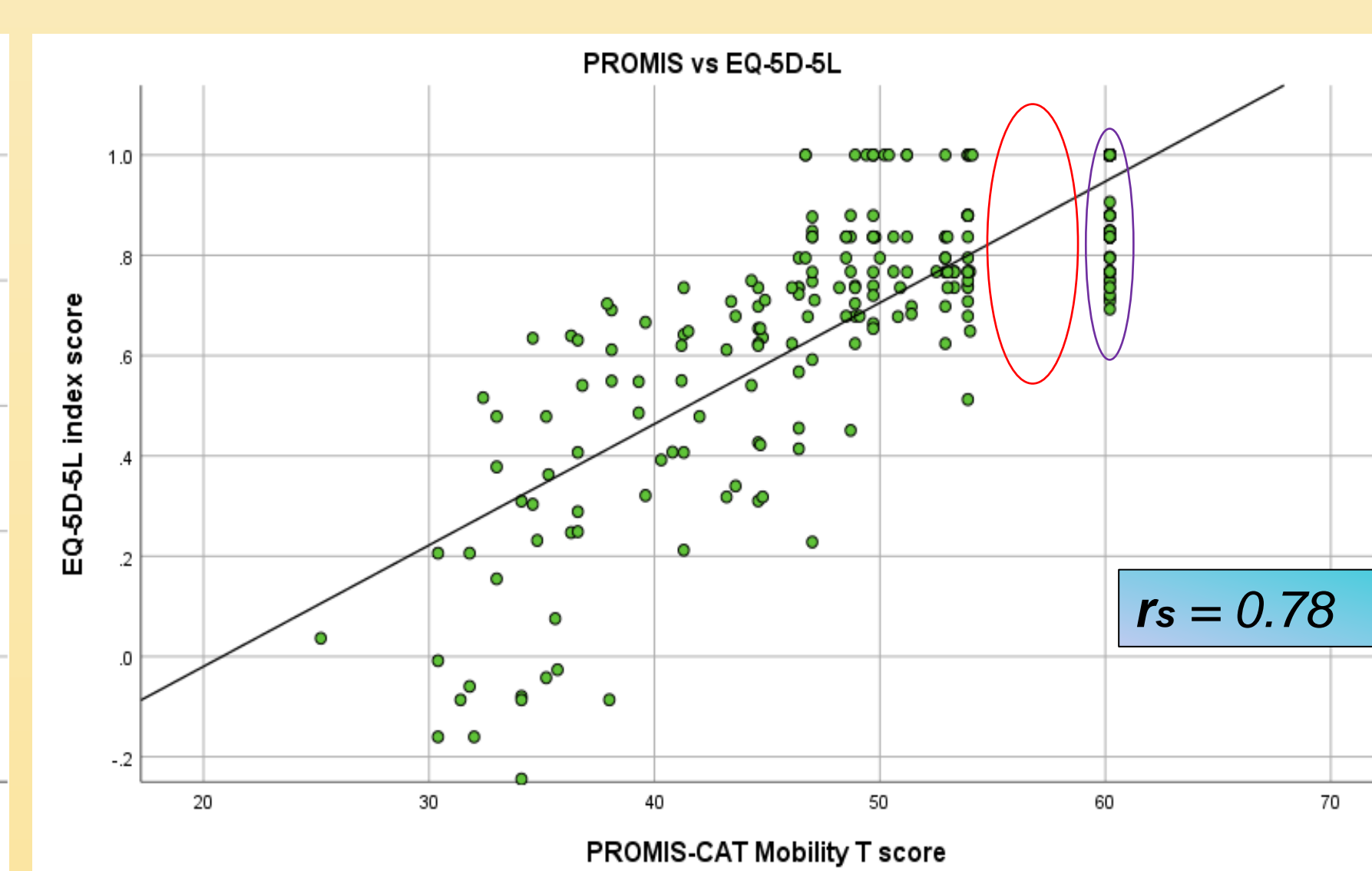


Figure 4 – Scatter plot of PROMIS vs NRS

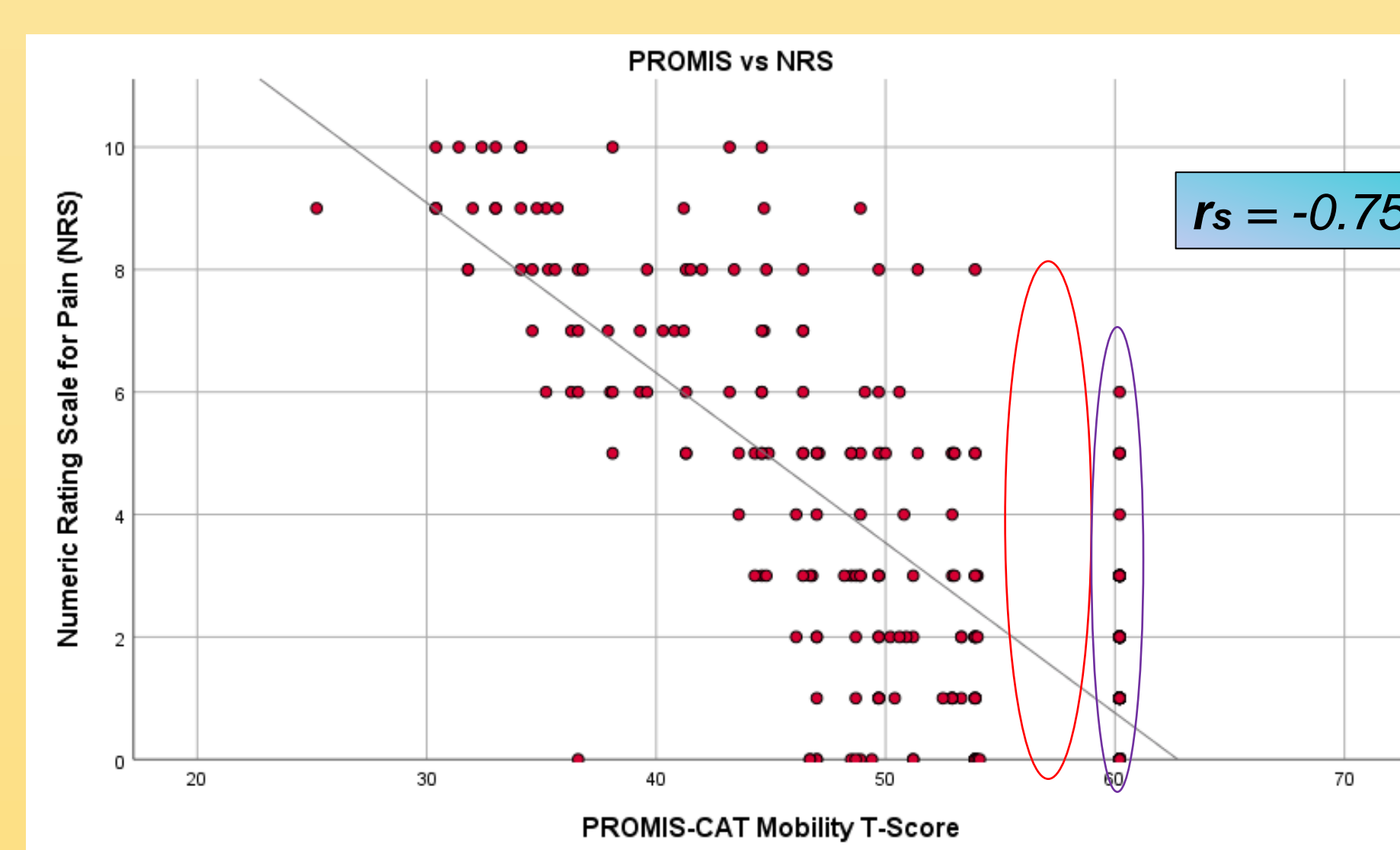
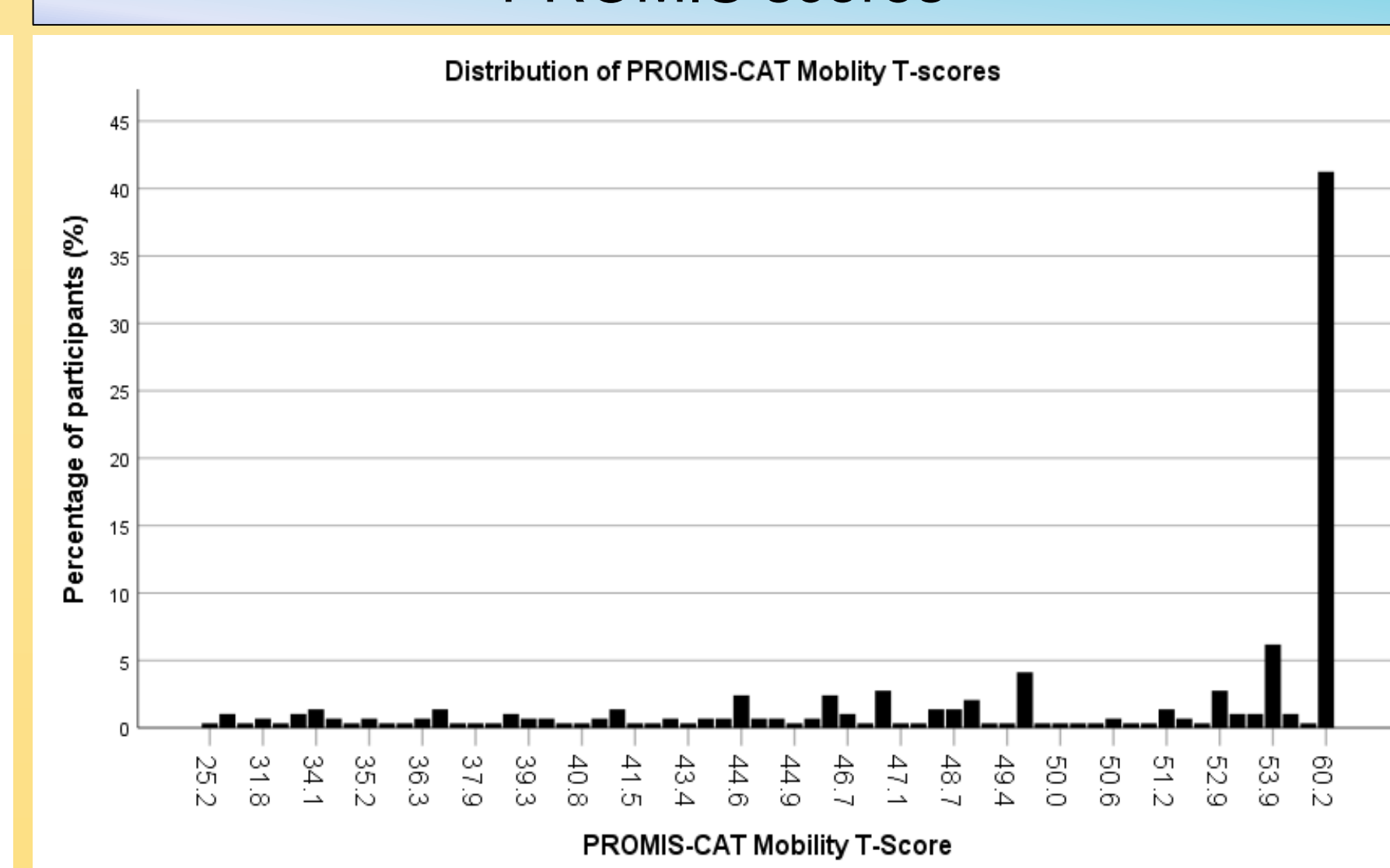


Figure 5 – Histogram showing distribution of PROMIS scores



## CONCLUSIONS

- PROMIS-CAT Mobility exhibits strong correlation with the legacy measure in functional assessment, as well as with other PROMs in this population of patients. PROMIS demonstrates convergent construct validity, though with a marked ceiling effect.
- There was clustering of physical function scores at the upper end of the distributions, which may reflect truncation of the data caused by participants having excellent outcomes.
- Whilst PROMIS is a useful tool, there were elements of hip-specific disease not captured within PROMIS Mobility alone.
- We suggest use should be in combination with additional instruments to assess patient outcome, particularly in the cases of higher functioning patients.



**References**

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