O15 Psychometric properties of Dutch-Flemish PROMIS sleep measures in Dutch childhood cancer patients receiving follow-up care

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Objective: Sleep problems are prevalent both during and after childhood cancer, with prevalence estimates ranging from 25% to 59%. Insomnia is the most frequently reported sleep disorder, typically assessed using the Insomnia Severity Index (ISI). Patient-Reported Outcomes Measurement Information System® (PROMIS®) offers standardized, cross-population measures. This study evaluates psychometric properties of PROMIS Pediatric Sleep Disturbance (SD) and Sleep-Related Impairment (SRI) measures in Dutch childhood cancer patients receiving follow-up care and examines the relationship between ISI-scores and PROMIS T-scores.

Methods: Patients (*n*=574) completed Dutch-Flemish PROMIS Pediatric SD v1.0 and SRI v1.0 full item banks, along with the ISI. Structural validity was evaluated using a Graded Response Model (GRM), assessing item fit statistics (S-X^2, $p<0.001$ indicated misfit). Measurement invariance for sex was assessed through Differential Item Functioning (DIF) analysis (McFadden's pseudo $R^2>0.02$ indicated DIF). Reliability of item banks, extracted short forms, and simulated Computerized Adaptive Testing (CATs) was estimated based on participants with a standard error (SE) of measurement ≤0.32, indicating reliability ≥0.90. Efficiency ($(1-SE(\theta)^2)/n_{items}$) was computed to evaluate the performance of each measure in relation to the number of items administered. Construct validity was assessed by correlating PROMIS T-scores with ISI raw summed scores. Known-group validity was tested by comparing PROMIS T-scores across ISI-defined insomnia severity groups using ANOVA.

Results: PROMIS SD did not meet GRM assumptions, indicating insufficient structural validity. PROMIS SRI demonstrated acceptable psychometric properties, with none of the items showing misfit or DIF. Moreover, reliability of PROMIS SRI was high (>0.90) at the mean of the sample and extended 2SD in the clinical direction. SF-4a was most efficient, followed by CATs. The mean T-score was 50.7 (*SD*=10.0). Correlation between PROMIS SRI and ISI was high (*r*=0.79). Mean PROMIS SRI T-scores increased with insomnia severity: no insomnia (*M*=45.6, *SD*=7.1), subthreshold insomnia (*M*=59.2, *SD*=5.7), clinical insomnia moderate (*M*=66.5, *SD*=4.8), and clinical insomnia severe (*M*=74.0, *SD*=3.4). T-scores differed significantly across groups ($p<0.001$).

Conclusion: PROMIS Pediatric SD showed insufficient structural validity. PROMIS Pediatric SRI showed sufficient psychometric properties in Dutch childhood cancer patients receiving follow-up care. PROMIS SRI correlated well with ISI-scores and distinguished between ISI-defined insomnia severity groups.