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Assessment of Everyday Executive Functioning Using the BRIEF in Children and Adolescents Treated for Brain Tumor

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Objective

Childhood brain tumors and their treatment often negatively affect development of executive functions (EFs) during childhood. Previous studies have reported EF deficits, associated with the most frequent pediatric brain tumors, mostly using performance-based neuropsychological assessments or, more recently, from questionnaires assessing EFs in everyday life. This study aimed to assess everyday life EFs following pediatric brain tumor in a larger and more histologically diverse sample than previously reported and to study clinical and demographic factors influencing outcome.

Methods

An assessment of executive functioning was undertaken using parent ratings of the Behavior Rating Inventory of Executive Function (BRIEF) in a large sample of children treated for various brain tumors ($n = 153$). A systematic analysis of all subscales and composite indices of the BRIEF questionnaire was performed. Mean T-scores and percentages of participants exhibiting significantly elevated T-scores ($T \geq 65$) were considered. The following clinical and demographic factors were collected: age at diagnosis, age at assessment, parental education level, and use of cranial radiation therapy. The association between each of these factors and parent-reported executive functioning was investigated.

Results

Among the sample (56% boys; age at diagnosis: mean = 6, SD = 3.61); age at assessment: mean = 11.8, SD = 3.39), significant difficulties were found in the 3 composite indices and in 6 of the 8 BRIEF subscales (T -scores ≥ 65 ; $p < .001$ in all cases), with a high frequency of complaints. The highest level of difficulties was observed in the Working Memory subscale (mean T -score = 61.82; $p < .001$; 37% of participants exhibiting clinically significant scores vs 4%-8% in the reference population), whereas hardly any deficit was found for the Inhibition and Organization of Materials subscales. Both older age at assessment and younger age at diagnosis were significantly associated with higher levels of parent-reported difficulties, particularly for metacognition ($R^2 = 0.085$; $p < .05$).

Conclusions

Parents of children treated for brain tumors report widespread and persistent deficits in EFs that negatively affect their everyday functioning. These difficulties vary from patient to patient. Including analysis of all clinical scales and composite indices allows a more comprehensive approach and enables to specify the patients' executive profile. This study focused on the consequences of EF deficits on everyday life functioning, but a comprehensive approach of EFs requires the combined use of performance-based measures and questionnaires.