

The Reliability and Validity of the Eating and Drinking Ability Classification System in Korean Cerebral Palsy



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Introduction

This study aims to ascertain the inter-rater reliability among a physician, a speech therapist, and a caregiver, as well as the intra-rater reliability within each evaluator, concerning the Korean iteration of the Eating and Drinking Ability Classification System (EDACS). Furthermore, we purpose to validate the EDACS against the Functional Oral Intake Scale (FOIS) for the assessment of swallowing function, and against other functional classification systems for pediatric cerebral palsy (CP), namely Gross Motor Function Classification System (GMFCS), Manual Ability Classification System (MACS), and Communication Function Classification System (CFCs).

This research seeks to establish the reliability and validity of the Korean version of EDACS by examining its agreement among diverse evaluators and its concurrent validity with established assessment tools. Such validation is important for precise diagnosis and establishment of treatment plans for pediatric CP.

Methods

This study is a prospective cross-sectional study and psychometric study that targeted 40 patients with cerebral palsy aged 3 to under 18 who visited our institution from October 2022 to August 2023. Children whose eating methods and postures had changed due to recent surgery for 3 months were excluded. After obtaining consent, the physician evaluated GMFCS and MACS, through direct face-to-face assessment, while the speech therapist assessed CFCs through an interview.

Evaluation using EDACS was conducted through recorded videos. Two video recordings were made by the caregiver with a one-week interval. At the time of video recording, caregivers were instructed to conduct the EDACS evaluation independently, without supervision from the physician or speech therapist. The submitted videos were evaluated separately by the physician and speech therapist for EDACS, with the physician additionally assessing FOIS.

The Korean version of EDACS was utilized as the official translated version, prepared by Kim et al. and three other individuals, and downloaded from www.edacs.org. The reliability of the EDACS was examined using weighted kappa (κ_w) and the validity was assessed by Kendall’s tau-b ($K\tau$) through SPSS 27.0.

Results

Participant characteristics

The mean age of the subjects was 8 years and 4 months, ranging from 3 years and 0 months to 17 years and 2 months. All children were capable of oral feeding, with only one child simultaneously receiving gastric tube feeding and oral feeding. None of the children were observed to be tube-dependent for feeding, as all had a FOIS score of 4 or above.

Inter-rater reliability

Stage: The agreement between physicians and speech therapists for the first and second assessments was found to be 0.940 and 0.919, respectively. The agreement between speech therapists and caregivers was 0.557 and 0.556 for the first and second assessments, respectively, with 16 and 17 cases differing in evaluation. The agreement between physicians and caregivers was 0.618 and 0.592, respectively, with 15 and 17 cases differing in evaluation. Among the cases where there was only one stage difference among all evaluators in the first assessment, 9 out of 16 cases (56.3%) were observed. Perfect agreement among physicians, speech therapists, and caregivers was observed in 24 cases, accounting for 60% of the total subjects. In 10 cases, the caregivers’ evaluation level was higher than that of the speech therapist and physician.

Independence: The agreement between physicians and speech therapists for the level of assistance was almost perfect for both the first and second assessments, with coefficients of 0.887 and 0.859, respectively. The agreement between physicians and caregivers was substantial for both assessments, with coefficients of 0.636. The agreement between speech therapists and caregivers was moderate, with coefficients of 0.542 and 0.507 for the first and second assessments, respectively. Maximum difference was only one stage in assistance level among all evaluators.

Intra-rater reliability

For each of the two assessments, the reliability for physicians, speech therapists, and caregivers was very high, with coefficients of 0.979, 0.980, and 0.980, respectively. The reliability for the level of assistance was perfect for physicians and caregivers, with coefficients of 1.0 for all subjects, and 0.972 for speech therapists. Almost perfect reliability was observed for all evaluators in both stage and level of assistance assessments.

SaLT	Physician					Total
	I	II	III	IV	V	
I	22	1	0	0	0	23
II	0	3	0	0	0	3
III	0	1	5	1	0	7
IV	0	0	0	7	0	7
V	0	0	0	0	0	0
Total	22	5	5	8	0	40

Table 1. Agreement between physician and speech therapist (SaLT) at first assessment

Caregiver	Physician					Total
	I	II	III	IV	V	
I	15	1	0	0	0	16
II	3	2	1	0	0	6
III	4	1	4	3	0	12
IV	0	1	0	4	0	5
V	0	0	0	1	0	1
Total	22	5	5	8	0	40

Table 2. Agreement between physician and caregiver at first assessment

	GMFCS	MACS	CFCs	FOIS
EDACS	0.662	0.721	0.617	-0.880
EDACS level of assistance	0.709	0.770	0.576	-0.702

Table 3. EDACS versus other classification scales (Kendall’s tau-b, p<0.05)

Discussion

In the context of pediatric patients with CP, the Korean version of EDACS shows significant consistency among professionals, including a physician and a speech therapist, as well as their caregivers who contributed to the evaluation. This indicates a strong agreement in evaluating EDACS, especially in terms of communicating the dietary levels in children with CP, thus augmenting its clinical utility. Furthermore, it demonstrates notable validity when compared to other functional classification systems for CP.