

Validity and Reliability of the Turkish Version of the Pediatric Assessment Scale for Severe Feeding Problems

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Received: December 16, 2019;

Initial review: February 10, 2020;

Accepted: December 16, 2020.

Objective: The purpose of this study was to translate the Pediatric assessment scale for severe feeding Problems (PASSFP) into Turkish and investigate its validity and reliability.

Methods: The study included Turkish translation of the PASSFP, and investigating its reliability and criterion validity in relation with Children's eating behavior questionnaire (CEBQ).

Results: Cronbach Alpha reliability of T-PASSFP was 0.79, and of its subscales, i.e. Form A and B, were 0.67, and 0.73, respectively. Test-retest correlation was 0.99 for the scale and Form A, and 0.94 for Form B. There were positive correlations between total scale and Enjoyment of food and Food fussiness subscales of CEBQ. Form A had positive relationships with Food responsiveness, Enjoyment of food, and Food fussiness subscales. Form B had positive correlations with Enjoyment of food and negative correlations with Slowness in eating subscales. **Conclusion:** The Turkish PASSFP is valid and reliable in evaluating feeding in children with neurodevelopmental disorders. Form A is applied for all children, and Form B is used for partially or totally oral-fed children

Keywords: Children's eating behavior questionnaire, Feeding behavior, Feeding disorders, Translation.

Feeding difficulty, including complex biological, social, and behavioral factors, expresses all problems affecting food intake [1-5]. Gastrostomy and tube feeding are commonly used for children with neurological disorders and feeding difficulties that can stem from oral sensory-motor or behavioral problems [6-9]. To determine feeding difficulties in children with neurodevelopmental disorders, clinical and behavioral factors should be evaluated besides oropharyngeal dysphagia assessment [4,10,11]. Evaluating parent-child relationships and behaviors during feeding is essential, as these children are dependent on their parents for feeding [12]. Pediatric feeding disorders (PFD) states that diagnosis and treatment of feeding disorders require a comprehensive approach including medical, nutritional, and psychosocial aspects as well as feeding skills [5,10].

The Pediatric assessment scale for severe feeding problems (PASSFP) evaluates medical, nutritional, and psychological aspects of feeding in relation with feeding type [3,5].

The purpose of the present study was to translate the PASSFP into Turkish and investigate its validity and reliability.

METHODS

The study was conducted at the Physical therapy and

rehabilitation faculty of Hacettepe university, and was approved by the ethics committee, and written consent forms were signed by the parents. To conduct validity and reliability studies on Turkish children, written permission was obtained from the developer of the PASSFP [3].

The PASSFP consisting of 15 questions and two forms, was filled out by parents/caregivers. Form A was applied for all children and is related to feeding type and sensory responses. Form B was used for partially or totally oral-fed children and is related to oral sensory-motor responses, behavior, and quality of life. While the 1st question inquired feeding type, the 2nd question about determined the ratio of oral feeding to tube feeding. 3rd to 9th questions scored between "never=0" to "always=4" on Likert scale. Lower scores on the PASSFP indicated higher severity [3].

The study included a) translating PASSFP into Turkish, and b) investigating reliability and criterion validity in relation with Children's eating behavior questionnaire (CEBQ). Additionally, the relationship between the PASSFP and children's height-weight was also examined.

The study included children with feeding difficulties who were at least 4 months of age. A minimum of 3 months

of tube feeding was set as the inclusion criteria for tube-fed children. Have different neurological diagnoses children with feeding difficulties were divided into 3 groups: i) orally-fed, ii) partially tube-fed, and iii) tube-fed. A priori power analysis conducted on G*Power 3.1.9.2 showed that 159 participants were required to achieve 0.80 power at $P=0.05$ for a medium-sized effect ($f=0.25$). We could recruit only 90 participants since most parents with oral-fed and partially oral-fed children did not accept participation. For that reason, we stopped data collection after reaching the sample size reported in the original study.

Based on translation-back translation method, two physiotherapists with good English skills prepared the initial Turkish version, and translated it back into English. The original and back translated versions were compared and the final version was arranged after necessary revisions based on the feedback from the pilot study conducted on 20 parents. Original and Turkish versions are given in the supplementary material section.

The internal consistencies for whole scale, Form A and Form B were calculated separately. To investigate the scale's internal consistency, following Crist, et al. [3], we examined the relationship between the first and second questions in Form A and the total score obtained from the remaining 13 items [3]. To examine the scale's consistency in time, it was reapplied to the same sample one week later (**Table II**). The re-test was applied to a total of 87 children.

To study the criterion validity, the correlations between CEBQ and T-PASSFP were calculated [13,14]. Furthermore, partial correlation coefficients were calculated to examine the relations between T-PASSFP and its sub-scales to the weight-height of the children. The comparisons of tube-fed, partially-tube-fed and orally-fed children were also examined for T-PASSFP total score, Form A, and Form B (**Table III**).

Developed by Wardle, et al. and adapted to Turkish Culture by Yilmaz et al, CEBQ, is a 35-item questionnaire answered by parents and rated on a five-point Likert scale [13,14]. It determines the appetite of the child in eight aspects: Food responsiveness (FR), Emotional over-eating (EOE), Enjoyment of food (EF), Desire to drink (DD), Satiety responsiveness (SR), Slowness in eating (SE), Emotional under-eating (EUE), and Food fussiness (FF).

Statistical analyses: Windows-based Statistical Package for Social Sciences (SPSS) ver.22 was used for statistical analysis. Means and standard deviations were calculated for quantitative variables and all statistical tests were conducted at 5% significance level. Since the T-PASSFP

scores of the groups violated the homogeneity of variance assumption, differences between the groups were examined using nonparametric statistics. To compare the groups, Kruskal-Wallis was performed on T-PASSFP total scores and scores of Form A, and Mann-Whitney U test was performed for the paired comparisons in Form B. The relationships between T-PASSFP and height-weight were analyzed using partial correlation coefficient.

RESULTS

The study included 90 children with neurological disorders having feeding difficulties (48 boys, 42 girls, mean (SD) age=34.11(21.04) month), who were divided into three groups: orally-fed ($n=45$), partially-tube-fed ($n=18$), and tube-fed ($n=27$). Mean (SD) age, height and weight of children according to the groups, were 43.49 (34.13) m, 89.56 (17.48) cm, 15.24 (20.97) kg for orally-fed; 31.00(25.57) m, 82.28(13.00)cm, 17.77(21.57) kg for partially-tube-fed; 40.00 (38.94) m, 84.89 (18.88) cm, 14.41(10.89) kg for tube-fed, respectively. The distribution of the children according to their diagnoses and type of feeding are given in Table I.

The internal reliabilities of the T-PASSFP, Form A, and Form B were 0.79, 0.67, and 0.73, respectively (**Table II**). The test-retest reliabilities, of T-PASSFP and Form A were 0.99, and Form B was 0.94 (**Table II**).

The correlations between T-PASSFP total score and the 1st and 2nd questions were 0.74 and 0.78, respectively. The 1st question identifies the feeding type of the child and the 2nd question explains the percentage of the child's oral or tube feeding. Correlations regarding

Table I Distribution of Children According To Their Diagnosis and Type of Feeding

Diagnosis	Oral-fed $n=45$	Partially tube-fed $n=18$	Tube-fed $n=27$	Total $n=90$
Undiagnosed	13 (14.4)	3 (3.3)	7 (7.8)	23 (25.5)
Cerebral Palsy	11 (12.2)	4 (4.4)	12 (13.3)	27 (30.0)
Different neurological disorders ^b	8 (8.9)	8 (8.9)	5 (5.6)	21 (23.3)
Gastrointestinal disorders ^a	2 (2.2)	1 (1.1)	0	3 (3.3)
Chromosomal disorders	3 (3.3)	1 (1.1)	1 (1.1)	5 (5.5)
Metabolic disorders ^c	6 (6.7)	1 (1.1)	2 (2.2)	9 (10.0)
Muscular diseases	2 (2.2)	0	0	2 (2.2)

^aThe primary diagnoses of these three children were gastrointestinal disorders. However, they also had neurological problems that were under examination and not diagnosed yet; ^bEpilepsy, hydrocephalus, encephalitis etc.; ^calso include syndromic disorders.

Table II Cronbach Alpha and Test-Retest Reliabilities of the T-PASSFP and Subscales, and Their Correlations With Children's Eating Behavior Questionnaire and Its Subscales

	Mean (SD)	Alpha	Test-Retest Reliability	Weight (kg)	Height (cm)	Children's Eating Behavior Questionnaire	Food responsiveness	Emotional over-eating	Enjoyment of food	Desire to drink	Satiety responsiveness	Slowness in eating	Emotional under-eating	Food fussiness
T-PASSFP.A	12.70 (5.00)	0.67	0.99	0.01	0.07	0.37 ^a	0.35 ^a	-0.03	0.47 ^a	0.28	0.06	0.01	0.19	0.44 ^a
T-PASSFP.B	21.01 (7.73)	0.73	0.94	0.09	0.06	0.06	0.27	0.21	0.53 ^a	0.11	-0.27	-0.46	-0.33 ^a	(0.31) ^a
T-PASSFP	27.80 (15.75)	0.79	0.99	0.07	0.07	0.24	0.28	-0.05	0.43 ^a	0.19	0.01	-0.15	0.11	0.36 ^a

T-PASSFP: Turkish-Pediatric Assessment Scale for Severe Feeding Problems Form (Total form), T-PASSFP.A: form A of T-PASSFP, T-PASSFP.B: form B of T-PASSFP. ^ap<0.05.

the Criterion Validity of T-PASSFP are given in **Table II**. The T-PASSFP had significant positive correlations with EF and FF subscales of CEBQ $P=0.002$; $P=0.012$ respectively). Positive correlation between T-PASSFP and FR subscale was marginally significant ($P=0.053$).

Form A had significant positive correlations with the FR, EF and FF subscales ($P=0.015$; $P=0.001$; $P=0.002$ respectively). The relationship between Form A and DD was not significant ($P=0.056$). Form B had positive correlation with EF and negative correlation with SE ($P=0.001$; $P=0.003$, respectively).

Partial correlations of weight and height (controlling for each other) with the T-PASSFP and its subscales were not significant ($P>0.05$) (**Table II**).

To investigate criterion validity, comparing the T-PASSFP scores of the groups showed that feeding type had a significant effect on the scores of T-PASSFP and Form A ($P<0.001$, $P<0.001$). Paired comparisons revealed that the “orally-fed” group had the highest scores on both T-PASSFP and Form A, and it was followed by the “partially tube-fed” and “tube-fed” groups ($P<0.001$). Form B scores of the “partially-tube-fed” and “orally-fed” groups were not significantly different ($P=0.11$) (**Table III**).

DISCUSSION

The PASSFP is the most appropriate test for children with neurologic disorders because of its ease of clinical implementation and its psychometric characteristics [10,15]. According to the present study, the Turkish version of the PASSFP is a reliable and valid instrument.

Cronbach Alphas of T-PASSFP at its subscales indicated sufficient internal consistencies. High test-retest correlations revealed a good consistency in time. These coefficients of reliability indicate the reproducibility of the T-PASSFP as the original study [3].

A high score in Form A indicates proper swallowing and appropriate sensory responses. The questions in Form A are related to the FR, EF, and FF, in which sensory responses examined (i.e. eating as a pleasant and desirable action, the taste and texture of food). DD, which examines to the fluid intake, is related (marginally significant) to the positive feeding skills examined in Form A. Oral-fed, partially-tube-fed and tube-fed children significantly differ on Form A reflecting their feeding-type and related sensory responses.

Form B includes questions related to oral sensory-motor responses (e.g. how resistant a child is to having their teeth/gums brushed/rubbed with a cloth), behavioral issues (e.g. how willing the child is to accept a

TABLE III Comparisons Among Oral- Fed, Partially Tube-Fed and Tube-Fed Children on PASSFP and Subscale Scores

		Mean (SD)		Mean Diff. (%95 CI of Diff.)	P
T-PASSFP.A	Oral-fed	16.64 (2.42)	Oral fed -Partially tube fed	5.44 (3.90/6.99)	< 0.001
	Partially tube fed	11.20 (3.86)	Oral fed -Tube fed	9.64 (8.56/10.73)	< 0.001
	Tube fed	7.00 (2.07)	Partially tube -Tube fed	4.20 (2.46/5.94)	< 0.001
T-PASSFP.B	Oral-fed	22.33 (6.89)	Oral fed - Partially tube fed	3.17 (-0.95/7.29)	0.108
	Partially tube fed	19.17 (8.86)			
T-PASSFP	Oral-fed	38.98 (8.23)	Oral fed - Partially tube fed	10.53 (5.28/15.77)	< 0.001
	Partially tube fed	28.4 (13.07)	Oral fed - Tube fed	31.98 (28.81/35.14)	< 0.001
	Tube fed	7.00 (2.07)	Partially tube - Tube fed	21.45 (16.41/26.49)	< 0.001

Mean Diff.: Mean Difference; %95 CI Diff.: %95 Confidence Interval for Mean Difference; *Mann-Whitney U tests were conducted as post-hoc test for probing the significant effects observed in Kruskal-Wallis Tests comparing Oral-Fed, Partially Tube-Fed and Tube-Fed groups on T-PASSFP and T-PASSFP.A. Since, T-PASSFP.B was not appropriate for Tube-Fed children, only Oral-Fed and Partially Tube-Fed groups were compared by using Mann-Whitney U test.

spoon), and quality of life (e.g. how much the child enjoys eating). Form B is positively related to the FF, EF, and EUE (i.e. positive feeding behaviors) and negatively to SE (i.e. a negative one). Since, oral feeding let children to gain experiences in feeding, oral-fed and partially-tube-fed children were similar on Form B.

Since T-PASSFP assesses feeding responses depending on children’s feeding type and analyzes various states of feeding difficulties, no correlation was found with the subscales related to the desire for eating (i.e. EOE, EUE, SR). Since tube-feeding provides children necessary nutrition, their height and weight are not correlated with T-PASSFP.

There is no golden standard test to analyze the criterion validity of the PASSFP. The CEBQ was used in the present study. However, since the CEBQ evaluates the behaviors and desire to eat, whereas PASSFP evaluates feeding difficulties, the testing parameters of these two scales do not completely coincide. This was an inevitable limitation of our study. The absence of any difference between orally-fed and partially-tube-fed children in Form B may be due to the fact that our orally-fed group also had feeding difficulties. This is another limitation of the study that healthy children without any feeding difficulties were not included. Future studies are recommended to provide comparisons with healthy orally-fed children as an additional evidence of the validity of Form B. Tube-fed and partially-tube-fed children undergo several medical interventions; causing many families reject to participate in the study, resulting in the fewer number of participants in our tube-fed and partially-tube-fed groups. Likewise, in their study, Crist et al collected data from a relatively smaller sample (n=74) [3]. Another limitation of the study is that the scale’s

construct validity could not be examined; one reason of which was the insufficient sample size for factor analysis. Furthermore, the factor structure of the scale was not examined in the original study of the PASSFP [3]. In their review study, Speyer et al. examined 12 scales evaluating pediatric feeding difficulties and reported that construct validity was not examined in any scale other than Dysphagia Disorder Survey [16,17].

The T-PASSFP has sufficient internal and test-retest reliabilities, and criterion validity, and can be used for evaluating feeding difficulties in children with neurodevelopmental disorders in Turkey.

Ethics clearance: Non-Invasive Clinical Research Ethics Committee of Hacettepe University; No. GO 13/433.

Contributors: MY: planning the study, collecting data and writing the manuscript; TA: statistical analysis and contribution to writing discussion section; SSA: contributing to data collection to data and writing discussion section; AAK: contributing to planning the study and interpretation the results.

Funding: None; *Competing interests:* None stated.

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WHAT THIS STUDY ADDS?

- The Turkish version of PASSFP, which is a validated scale, is found to be a valid and reliable tool.

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