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Reliability and construct validity of the Turkish adaptation of the Assessment of Life Habits for children and adolescents with cerebral palsy

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ABSTRACT

Objectives: The Assessment of Life Habits (LIFE-H) is a well-known questionnaire used to evaluate participation. The aim of this study was to determine the reliability and validity of the Turkish version of the LIFE-H in children with Cerebral Palsy (CP).

Patients and Methods: The study included 450 children with CP between the ages of 2-18 years old. The internal consistency and test-retest reliability of the LIFE-H were calculated. The construct validity of the LIFE-H was determined with the Pediatric Evaluation of Disability Inventory (PEDI) domains and Pediatric Outcome Data Collection Instrument (PODCI) subscales.

Results: The mean age of the children was 8.37±5.13 years (42.4% female, 57.6% male). The internal consistency of the LIFE-H was determined to be acceptable for all categories (Cronbach alpha:0.794-0.999). The test-retest reliability values were found to be of good to excellent reliability (ICC:0.804-0.999). The correlation between the LIFE-H total scores, PODCI subscales and PEDI domains was determined as acceptable (rho between 0.538-0.894) except for the Pain/Comfort, Happiness subscales of the PODCI (rho:0.240 – 0.479).

Conclusions: It was determined that the Turkish LIFE-H had acceptable internal consistency, good test-retest reliability and satisfactory construct validity. Turkish LIFE-H is an appropriate tool to assess the participation of children and adolescents with CP.

Keywords: Cerebral palsy, Children, Participation, Reliability, Validity

1. INTRODUCTION

Participation is a multidimensional structure and means to be a part of life [1]. The International Classification of Functioning, Disability and Health-Children and Youth (ICF-CY), suggests a multidimensional assessment that includes body functions, activity, participation, personal and environmental factors for children up to 18 years of age [2].The participation in daily life of children involves going to the playground, playing with friends and sharing with friends and other people. By doing so children learn new skills, improve their abilities and develop their sense of personal identity [3, 4]. Preschool children frequently play both indoors and outdoors, while school-age children and adolescents communicate with their peers at school and social settings [3].

Cerebral palsy (CP) is a chronic picture that creates impairment and activity restriction in body structures and functions such as muscle tone disorder, joint contracture and cognitive and emotional changes [5]. In general, children with CP demonstrate lower participation levels compared their typically developing peers [6]. Over the past two decades, participation in daily life has begun to attract more and more attention as an outcome of rehabilitation of children with CP [7]. Considering the ICF framework, the main purpose of therapeutic intervention in children with CP is meaningful participation in daily life [8].

According to the Turkish Statistical Institute, in 2019 the number of live-born infants in Turkey was 1 million 183 thousand 652 [9]. Accordingly, the prevalence of CP in Turkey is 0.4%,

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with approximately 4,700 babies considered to be at risk of CP every year [10]. Despite the large population of children with CP there is no scale in the Turkish language that evaluates the participation of such children.

As explained above participation is a complex phenomenon, thus, it is important to better understand how personal, environmental and family factors affect the participation of children in daily activities [11]. Within this context, participation in daily life must be evaluated accurately and in detail. The Assessment of Life Habits (LIFE-H) is a valid and reliable questionnaire that has been widely used in the literature to evaluate participation in daily life [12]. It was created according to the Disability Creation Process model, the intention of which is to predict the risk of personal and environmental factors affecting participation in life or handicap experience [12]. The LIFE-H was originally created in English and French, and studies for the translation of the questionnaire into different languages continue today [12]. The present study primary aimed to examine the reliability and validity of the Turkish version of the LIFE-H children and adolescents of three different age groups (0-4 years, 5-13 years and general) with CP and secondary was to encourage to use it and focus on participation profile for Turkish children and adolescents with CP.

2. PATIENTS and METHODS

The required permits and approvals were obtained from the Ankara Provincial Directorate of National Education and the Non-Interventional Clinical Research Ethics Committee of Hacettepe University for the study (Permit No: GO 14/451-11). The study was registered in the Clinical Trials.gov system under the number NCT03195335. The families who accepted to participate were informed about the study and their written consent was obtained. The data were collected between September 2017 and January 2019.

In this methodological study, 450 children with CP and their parents residing in Ankara city and its districts participated. The participants were determined with the convenience sampling method. Evaluations were carried out on the children who applied to the Hacettepe University, Cerebral Palsy and Pediatric Rehabilitation Unit and those in the special education and rehabilitation centers in Ankara City.

The inclusion criteria of this study were as follows: (1) being diagnosed with CP, (2) being between the ages of 2-18 years old, (3) having parents capable of reading and writing in the Turkish language and (4) voluntarily consenting to participate in the study. Information regarding the age and sex of the children and adolescents with CP were recorded. The individuals with missing data in the evaluation form were excluded from the study.

The Gross Motor Function Classification System (GMFCS) [13, 14] was used to classify the gross motor function levels of the children, the Manual Ability Classification System (MACS) [15, 16] for the manual abilities, the Communication Function Classification System (CFCS) [17] for the communication abilities and the Eating and Drinking Ability Classification System (EDACS) [18] for the eating and drinking abilities. All these functional classifications were used for description of cases and sustained from family report.

LIFE-H

The LIFE-H has three different forms for different age groups: 0-4 years, 5-13 years and general (teenagers, adults and seniors). In this study all three forms were used. The general form was used for the children aged between 14-18 years old. The LIFE-H consists of 12 categories, namely nutrition, fitness, personal care, communication, housing, mobility, responsibilities, interpersonal relationships, community life, education, employment and recreation. The number of questions related to the categories varies according to the form of each age group. Detailed information is given in Appendix I. The questions are scored on a 9-point Likert scale. Scoring is performed by considering both the difficulty level of the skill (no difficulty/some difficulty) and the type of support (no assistance/with technical aid or adaptation/with human assistance) [19, 20]. The weighted scores are calculated for the LIFE-H scores. The highest score that can be obtained in total LIFE-H score or from each category is 10, while the lowest score is zero (0). Higher scores mean better participation in daily life. Detailed information on the scoring of the LIFE-H questions is provided in Appendix II. LIFE-H can be used as a patient report in patients with sufficient cognitive function. As well, it can be used as a parent report. In our study, parents of the children with CP completed the questionnaire. The scale was applied to face-to-face interview to the parents by physiotherapists.

Scores can be calculated for each category of LIFE-H. In addition, the Activities of Regular Living Total Score, which is the average of the first six categories; the Social Roles Total Score, which is the average of the last six categories and the LIFE-H Total Score, which is the average of all categories, can also be calculated [20-23].

In this study, the LIFE-H was translated into Turkish. To do so, the necessary permission was obtained from the International Network on the Disability Creation Process. Two translations were carried out from English into Turkish by two physiotherapists experienced in pediatric rehabilitation. After completion, the two translations were compared and combined. The obtained Turkish questionnaire was examined by an expert in Turkish language. It was then translated back into English by a translator who was not familiar with the subject of study. The back translated questionnaire was compared with the original [24]. For cultural adaptation, the questionnaire was presented to the families of the children with CP. Any item of the scale has not been changed. The questionnaire was evaluated in terms of grammar and its suitability to the Turkish culture by five physiotherapists and a pediatric neurologist specializing in CP for social acceptance. In order to define the reliability of the LIFE-H, a re-test was carried out 15 days after the initial evaluation.

The Pediatric Outcome Data Collection Instrument (PODCI) and Pediatric Evaluation of Disability Inventory (PEDI) were used to determine the construct validity of the LIFE-H.

Pediatric Outcome Data Collection Instrument

Pediatric Outcome Data Collection Instrument is used to determine the functional health status and health-related quality of life of children and adolescents. In this study, the Turkish version of PODCI, the validity and reliability of which have been proven, was applied to the children with CP [25, 26]. PODCI is comprised of five subscales: Upper Extremity and Physical Function, Transfer and Basic Mobility, Pain/Comfort, Happiness, Sports and Physical Functioning, and Global Functioning. The scores of PODCI are calculated separately for each subscale and range from 0-100 points. Higher scores represent better health [25].

Pediatric Evaluation of Disability Inventory

Pediatric Evaluation of Disability Inventory is a comprehensive clinical assessment tool that evaluates the functional ability and performance of children with disabilities. In this study, the Turkish version of PEDI, the validity and reliability of which have been proven, was applied to the children with CP [27, 28]. PEDI has three main subscales, namely functional skills, caregivers' assistance and modification. In this study, functional skills and caregivers assistance subscales were used due to the fact that the LIFE-H has similar content. The functional skills subscale measures the functional abilities of the children and consists of 197 items comprised of self-care (73 items), mobility (59 items) and social function (65 items) domains. In functional skills subscale children are scored as unable (0) or capable (1). Higher scores mean better functional ability and performance. The caregivers' assistance subscale measures the disability of the children according to the amount of help they require to perform functional activities and is comprised of self-care (8 items), mobility (7 items) and social functions (5 items) domains. The caregivers' assistance subscale is scored between '0 = totally dependent' to '5 = independent'. High scores mean that activities can be carried out independently.

Figure 1 presents the activity-participation and life habits covered by LIFE-H, PEDI and PODCI.

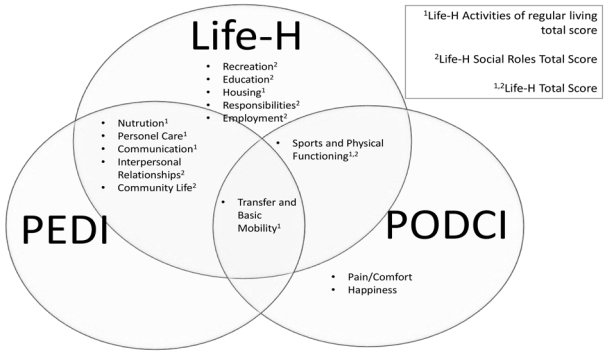

***Figure 1**. Areas covered by LIFE-H, PEDI and PODCI scales.*

Statistical Analysis

SPSS (IBM SPSS Statistics for Windows, Version 23.0. IBM Corp. Armonk, NY, USA) package program was applied for the data analysis. Mean and standard deviation were used as the descriptive statistics for the quantitative data. A p value of less than 0.05 was considered to indicate a statistically significant difference.

The internal consistency of the LIFE-H was calculated by using Cronbach's alpha, which was considered acceptable at ≥ 0.70 [29, 30].The intraclass correlation coefficient (ICC) was applied to examine the test-retest reliability. ICC values less than 0.5 were interpreted as weak reliability, those between 0.5-0.75 as moderate reliability, those between 0.75-0.9 as good reliability, greater than 0.90 as excellent reliability [31].

The construct validity was determined with the relation between the LIFE-H total scores and the PODCI subscales and PEDI dimensions using the Spearman's rho correlation coefficient. In addition, the correlations between LIFE-H total scores and functional classification systems were examined. Spearman rho values between 0.10 and 0.29 were interpreted as weak correlation, those between 0.30–0.49 as moderate correlation, those greater than 0.50 as high correlation [32].

3. RESULTS

A total of 450 children (42.4% girls, 57.6% boys) with CP and their parents participated in this study. The average age of the children was 8.37±5.13 years. The flow diagram of the participants is given in Figure 2. Information concerning the clinical type, extremity distribution, and function classification levels are presented in Table I.

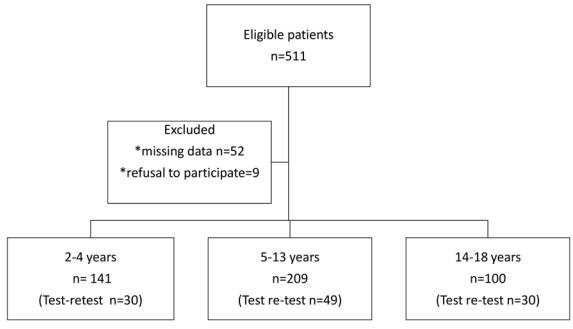

***Figure 2.** Flow Diagram*

Reliability

The internal consistency of the LIFE-H form for all the age groups was determined to be acceptable for all categories (Cronbach alpha: 0.794-0.999). The test-retest reliability of the LIFE-H according to the ICC values was found to be good for the fitness (ICC=0.879), communication (ICC=0.858), mobility (ICC=0.804), responsibility (ICC=0.883) and interpersonal relationships (IC=0.872) categories and excellent for the other categories (ICC=0.904-0.999) for 0-4 age form. ICC values were

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determined to be good for the interpersonal relations (ICC=0.817) category and excellent for the other categories (ICC=0.912-0.894) for 5-13 ages form. It was determined that all categories in general form showed excellent reliability (ICC=0.911-0.998).The internal consistency coefficients for the LIFE-H categories are presented in Table II and the test-retest reliability of the LIFE-H categories and total scores are given in Table III.

Construct validity

For 0-4 ages form a medium to high correlation (r=0.791-0.369) was observed between the LIFE-H total scores and PODCI subscales. The best relationship was observed between the LIFE-H Activities of Regular Living total score and the PODCI Transfer and Basic Mobility (r= 0.791). A high correlation (r=0.838-0.674) was determined between the LIFE-H total scores and PEDI domains. The best relationship was observed between the PEDI caregiver's assistance Mobility and LIFE-H Activities of Regular Living total score (r= 0.838).

Significant correlations for 5-13 age group form, varying from high to moderate, were discovered between the LIFE-H total scores and PODCI subscales (r= 0.894-0.374). When the relationships between the LIFE-H total scores and PEDI domains were analyzed it was determined that there was a high relationship between all domains (r=0.863-0.739). The most substantial relationship was observed between the caregiver assistance-mobility domain of the PEDI and the LIFE-H total score (r= 0.863).

General form a high-low correlation (r= 0.240-0.850) was observed between the LIFE-H total scores and PODCI subscales. The highest relationship was observed between the LIFE-H Activities of Regular Living total score and the transfer and basic mobility subscale of PODCI (r= 0.850). When the relationship between the LIFE-H total scores and PEDI domains were analyzed it was determined that there was a high correlation (r= 0.871-0.683). The construct validity of the LIFE-H with the PODCI subscales and PEDI domains are presented in Table IV.

There were high negative correlations of the LIFE-H total scores with the functional classification systems. All of the LIFE-H total scores showed the highest correlations with GMFCS level. As the GMFCS level worsens, participation in daily life decreases for all age groups. That was similar for the other classification systems. Correlations between the LIFE-H total scores with the functional classification systems are presented in Table V.

Table I. *Socio-demographic information and functional classification levels of participants*

Characteristics			Age Groups					
			0-4 years form		5-13 years form		General form	
			Number	%	Number	%	Number	%
Gender	Female		50	35.46	95	45.45	46	54.00
	Male		91	65.53	114	54.54	54	46.00
Clinical Type	Spastic	Hemiparesis	33	23.40	40	19.13	29	29.00
		Diparesis	30	21.27	64	30.62	18	18.00
		Quadriparesis	31	21.98	55	26.31	31	31.00
	Dyskinetic		25	17.73	29	13.87	13	13.00
	Ataxic		3	2.12	8	3.82	9	9.00
	Hypotonic		17	12.05	3	1.43	-	-
GMFCS	Level I		28	19.85	45	21.53	17	17.00
	Level II		31	21.98	42	20.09	31	31.00
	Level III		24	17.02	43	20.57	13	13.00
	Level IV		29	20.56	44	21.05	30	30.00
	Level V		29	20.56	35	16.74	9	9.00
MACS	Level I		40	28.36	65	31.10	23	23.00
	Level II		40	28.36	59	28.22	31	31.00
	Level III		21	14.89	36	17.22	24	24.00
	Level IV		15	10.63	16	7.65	15	15.00
	Level V		25	17.73	33	15.78	7	7.00
CFCS	Level I		61	43.26	118	56.45	62	62.00
	Level II		26	18.43	23	11.00	11	11.00
	Level III		19	13.47	21	10.04	18	18.00
	Level IV		17	12.05	26	12.44	6	6.00
	Level V		18	12.76	21	10.04	3	3.00
EDACS	Level I		92	65.24	141	67.46	78	78.00
	Level II		7	4.96	22	10.52	12	12.00
	Level III		25	17.73	24	11.48	6	6.00
	Level IV		8	5.67	7	3.34	2	2.00
	Level V		9	6.38	15	7.17	2	2.00

GMFCS: Gross Motor Function Classification System, MACS: Manual Ability Classification System, CFCS: Communication Function Classification System EDACS: Eating and Drinking Ability Classification System

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Table II. *Internal Consistency (Cronbach's alpha) coefficients for LIFE-H categories*

LIFE-H categories and total scores	Cronbach alpha		
	0-4 years form	5-13 years form	General form
Activities of Regular Living Total	0-990	0.986	0.992
Nutrition	0.969	0.924	0.911
Fitness	0.794	0.888	0.917
Personal Care	0.972	0.975	0.991
Communication	0.967	0.981	0.985
Housing	0.977	0.975	0.970
Mobility	0.873	0.957	0.960
Social Roles Total	0.973	0.985	0.987
Responsibility	0.894	0.933	0.944
Interpersonal Relationships	0.932	0.958	0.882
Community Life	NA	0.911	0.988
Education	0.999	0.972	0.993
Employment	NA	NA	0.952
Recreation	0.975	0.989	0.992
LIFE-H Total	0.992	0.993	0.994

NA: Values are not calculated because there is one question in Community Life category in the 0-4 age form, there are no questions in Employment category in the 0-4 age form, there are one question in Employment category in the 5-13 age form.

Table III. *Test-retest reliability of LIFE-H categories and total scores*

LIFE-H categories and total scores	0-4 years form		5-13 years form		General Form	
	ICC	95%CI	ICC	95%CI	ICC	95%CI
Activities of regular living total score	0.962	0.919-0.982	0.983	0.969-0.990	0.989	0.977-0.995
Nutrition	0.917	0.825-0.960	0.984	0.971-0.991	0.970	0.936-0.986
Fitness	0.879	0.746-0.942	0.970	0.946-0.983	0.947	0.888-0.975
Personal Care	0.939	0.871-0.972	0.962	0.931-0.979	0.978	0.953-0.989
Communication	0.858	0.689-0.935	0.947	0.902-0.971	0.976	0.950-0.989
Housing	0.947	0.888-0.975	0.953	0.915-0.974	0.998	0.995-0.999
Mobility	0.804	0.576-0.909	0.946	0.901-0.971	0.919	0.828-0.962
Social Roles Total Score	0.935	0.864-0.969	0.928	0.872-0.960	0.969	0.935-0.985
Responsibility	0.883	0.748-0.946	0.933	0.864-0.967	0.976	0.946-0.989
Interpersonal Relationships	0.872	0.732-0.939	0.817	0.670-0.899	0.974	0.945-0.988
Community Life	0.999	0.994-1.000	0.912	0.809-0.959	0.965	0.915-0.985
Education	0.961	0.866-0.989	0.916	0.825-0.959	0.940	0.845-0.977
Employment	NA	NA	NA	NA	0.984	0.957-0.994
Recreation	0.904	0.792-0.955	0.960	0.919-0.980	0.911	0.797-0.961
LIFE-H Total Score	0.953	0.901-0.978	0.970	0.947-0.983	0.988	0.976-0.995

ICC: Intraclass correlation coefficient, CI: confidence intervals, NA: Values are not calculated because there is one question in Community Life category in the 0-4 age form, there are no questions in Employment category in the 0-4 age form, there is one question in Employment category in the 5-13 age form.

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Table IV. *Construct validity of LIFE-H with PODCI subscales and PEDI domains*

Age groups			PODCI						PEDI					
									Functional Skills			Caregivers Assistance		
	LIFE-H total scores		Upper Extremity and Physical Function	Transfer and Basic Mobility	Pain/ Comfort	Happiness	Sports and Physical Functioning	Global Functioning	Self-Care	Mobility	Social Function	Self-Care	Mobility	Social Function
0-4 years form	Activities of regular living total score	Spearman rho	0.750	0.791	0.429	0.456	0.757	0.769	0.807	0.799	0.675	0.688	0.838	0.739
		p	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Social Roles Total Score	Spearman rho	0.672	0.648	0.369	0.538	0.676	0.646	0.765	0.715	0.674	0.691	0.754	0.742
		p	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	LIFE-H Total Score	Spearman rho	0.724	0.743	0.409	0.479	0.737	0.736	0.807	0.778	0.688	0.702	0.812	0.749
		p	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
5-13 years form	Activities of regular living total score	Spearman rho	0.845	0.894	0.405	0.417	0.823	0.866	0.853	0.826	0.841	0.835	0.862	0.791
		p	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Social Roles Total Score	Spearman rho	0.772	0.801	0.374	0.391	0.743	0.791	0.770	0.755	0.773	0.756	0.811	0.739
		p	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	LIFE-H Total Score	Spearman rho	0.841	0.874	0.411	0.412	0.809	0.859	0.845	0.822	0.837	0.826	0.863	0.792
		p	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
General Form	Activities of regular living total score	Spearman rho	0.797	0.850	0.240	0.352	0.833	0.839	0.729	0.831	0.818	0.831	0.871	0.791
		p	<0.001	<0.001	0.017	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Social Roles Total Score	Spearman rho	0.761	0.798	0.259	0.317	0.820	0.799	0.683	0.743	0.758	0.741	0.773	0.744
		p	<0.001	<0.001	0.010	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	LIFE-H Total Score	Spearman rho	0.799	0.840	0.250	0.330	0.842	0.834	0.728	0.806	0.809	0.812	0.840	0.786
		p	<0.001	<0.001	0.013	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

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Table V. *Correlation between LIFE-H total scores and functional classification systems*

		0-4 years form				5-13 years form				General Form			
LIFE-H scores		GMFCS	MACS	CFCS	EDACS	GMFCS	MACS	CFCS	EDACS	GMFCS	MACS	CFCS	EDACS
Activities of regular living total score	r	-0.778	-0.775	-0.735	-0.715	-0.810	-0.689	-0.706	-0.654	-0.828	-0.700	-0.603	-0.582
	p	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Social Roles Total Score	r	-0.734	-0.729	-0.712	-0.652	-0.696	-0.583	-0.624	-0.567	-0.768	-0.678	-0.555	-0.506
	p	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LIFE-H Total Score	r	-0.763	-0.756	-0.741	-0.698	-0.786	-0.668	-0.703	-0.560	-0.818	-0.705	-0.595	-0.558
	p	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

GMFCS: Gross Motor Function Classification System, MACS: Manual Ability Classification System, CFCS: Communication Function Classification System EDACS: Eating and Drinking Ability Classification System

Spearman Correlation Analysis

4. DISCUSSION

The evaluation of the participation in daily life of children with CP is an essential concern as doing so may make it achievable to prevent the restriction of their participation in life habits. The LIFE-H is a vital questionnaire formed under the roof of the ICF and evaluates children in different life conditions from infancy to adulthood. In the present study it was determined that the questionnaire had good internal consistency and test-retest reliability and was valid at the acceptable level. This study is the first to display the validity and reliability of the LIFE-H in a large sample group by involving children of all age groups with CP.

According to the results of the study, the internal consistency of the 0-4 years, 5-13 years and general forms of the LIFE-H was determined to be acceptable for all categories. The highest values for internal consistency were observed for the general form. In their study conducted with 24 children and 25 adults, Noreau et al. [20] reported that the internal consistency for the LIFE-H was high (Cronbach $\alpha \geq 0.82$). This finding corresponds with the result obtained in the present study. The test-retest reliability of the LIFE-H was determined to be of high-very high reliability for all categories apart from the medium reliability observed for the mobility category for the 0-4 years ages form. In addition, test-retest reliability was determined to be high-very high reliability for the 5-13 years ages form and general form of the LIFE-H. The highest values for the test-retest reliability were taken for the general form. The test-retest results for the reliability of the LIFE-H revealed that the questionnaire was reliable. In their study conducted with children aged between 5-13 years with physical disabilities, Noreau et al. [23] determined that the intra-rater reliability was good-excellent for 11 categories of the LIFE-H. They reported that the lowest ICC value (0.58) was taken for the interpersonal relationship category and stated that this low score may have been caused by the lack of variability in the data. In the present study, the lowest ICC value for the 5-13 years ages form was obtained in the interpersonal relationships category. In a study conducted with 24 children and 25 adults it was reported that the test-retest reliability was lower in the children (ICC = 0.67) compared to the adults (ICC = 0.83) in terms of the total score [20]. In another study conducted with children with CP aged between 5-13 years old, it was determined that the Persian version of LIFE-H held good test-retest reliability as the ICC values for all categories were higher than 0.60 and 0.78 in terms of the total score [33].

In the present study, the relation of the LIFE-H for construct validity with two different surveys was examined. However, it is limiting to discuss the findings of this study with those of the literature as there are very few studies concerning the sample group included in this study. In general, the studies in the literature have been conducted with adults, thus, in these studies the general form was applied. PODCI and PEDI were used to demonstrate the validity of the LIFE-H. For all three forms of the LIFE-H better relationships were observed in the dimensions close to each other such as the LIFE-H Activities of Regular Living total score and LIFE-H total score and PODCI upper extremity and physical function, transfers and basic mobility, sports and physical function, global function subscales. Weak correlations were observed between distant dimensions such as the LIFE-H scores and PODCI Pain/Comfort and Happiness subscale.

A high and moderate relationship was observed between the LIFE-H total scores and the PEDI domains for all three forms. The best relationships for all forms were observed between the LIFE-H total scores and the PEDI caregivers' assistance-mobility domain. This may be due to the fact that there are many questions concerning mobility on both scales and that the LIFE-H not only considers the level of participation that is performed independently, but also the participation with human assistance. For this reason, a higher relationship may have been found between LIFE-H scores and the part in PEDI that questions how much caregiver assistance is needed for mobility. In a study carried out on children between the ages of 5-13 with CP the reliability of LIFE-H in terms of its relationship with PEDI was evaluated and it was reported that the dimensions that measured similar structures on these two scales presented higher correlations and the dimensions that measured different

structures gave lower correlations [23]. In that study, they determined that the self-care and mobility domain of PEDI and the personal care and housing categories of the LIFE-H (0.79 <r <0.88) were closely related, in addition to the Social Function domain of PEDI and the communication and responsibility categories of LIFE-H (r = 0.80-0.81) [23]. In the present study, it was observed that the relationships were relevant among the dimensions with similar structures. Mortavazi et al. [33] applied the 5-13 years form of the LIFE-H to children with CP and investigated the construct validity of the Persian version with Lawshe's method. As a result, they found that the questionnaire had good validity and was suitable for both research purposes and clinical use.

In our study, it has been shown that participation in daily life is broadly related to children's functional ability which is classified with four different functional classification systems. A negative relationship was found between all classification systems used and LIFE-H total scores. In a study evaluating participation in children with CP using the Child Engagement in Daily Life Measure; it is reported that children with better gross motor, manual ability, and communication functions had higher frequency and pleasure of participation [34]. In another study that assessed the participation of the children by semi-structured interviews with parents; it has been stated that the participation of children are closely related to communication and mobility [35]. Since the aim of our study was to determine the reliability and validity of LIFE-H, this subject was not focused on. However, in further studies, it is important to investigate the relationship between functional classifications (especially for EDACS) and participation in daily life should be examined in more detail and interventions that will encourage participation for children with different functional levels.

The study has some substantial aspects. A total of 450 children with CP and adolescents were involved in this study. In the literature, in the studies analyzing the validity and reliability of the LIFE-H mostly the general form was used and individuals over 60 years old with disabilities or with healthy young adults were involved. In that studies sample size is generally range between 75-100 individuals. In this regard, the present study is the first to have such a high sample size that involves children and adolescents with CP.

Limitations

As there are no other Turkish scales evaluating the participation in daily life of this age group, the construct validity of the LIFE-H was compared with PEDI and PODCI, which comprise various areas of ICF such as activity, participation, environmental and personal factors. In future studies, it would be beneficial to translate the different scales evaluating the participation in daily life of the related age group into Turkish and compare the strong and weak aspects of these scales in terms of clinical use and research purposes.

Conclusion

The LIFE-H is a worthy questionnaire showing functional independence, participation in daily life, education and leisure activities. The present study is significant as this much high sample size was comprised of children and adolescents with CP for the first time in the literature. In the study, the reliability and validity of the LIFE-H were presented for three different age forms and the Turkish LIFE-H was appended to the literature as a reliable and valid questionnaire to evaluate the participation in daily life of children and adolescents with CP. Admitting that the number of Turkish scales, which that directly evaluate participation are wholly insufficient, it is considered that the LIFE-H questionnaire for children with CP will have significant contributions both in clinical and research purposes. In addition, it is thought that the adaptation of the LIFE-H scale into Turkish will provide a useful resource for practitioners not only in Turkey and Turkish-speaking countries but also provide a useful resource for practitioners in many countries, where Turkish immigrants reside.

Compliance with Ethical Standards

Ethics approval: This study was performed in line with the principles of the Declaration of Helsinki. Approval was granted by the Ethics Committee of Non-interventional Clinical Research of Hacettepe University (Number: GO 14/451-11). Written informed consent was obtained from the parents of the children who participated in this study.

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Appendix I. Number of questions for LIFE-H categories according to different age group forms.

LIFE-H Categories	Question numbers in different age forms		
	0-4 years form	5-13 years form	General form
Activities of Regular Living Total Score	36	34	37
Nutrition	7	4	4
Fitness	3	4	4
Personal Care	8	8	8
Communication	9	8	8
Housing	6	6	8
Mobility	3	4	5
Social Roles Total Score	25	30	40
Responsibility	5	7	8
Interpersonal Relationships	5	6	7
Community Life	1	2	8
Education	4	6	2
Employment	-	1	8
Recreation	10	8	7

Appendix II. Scoring of LIFE-H

Life Habits Accomplishing Scale		
9	Without difficulty	Without assistance
8	Without difficulty	Assistive device (or adaptation)
7	With difficulty	Without assistance
6	With difficulty	Assistive device (or adaptation)
5	Without difficulty	Assistance of a person
4	Without difficulty	Assistive device (or adaptation), additional assistance of a person
3	With difficulty	Assistance of a person
2	With difficulty	Assistive device (or adaptation), assistance of a person
1	Accomplished by another one	
0	Not accomplished	
N/A	Not applicable	