JETR

JOURNAL OF
EXERCISE THERAPY
AND REHABILITATION

Journal of Exercise Therapy and Rehabilitation. 2025;12(2):128-135. DOI: 10.15437/jetr.1507469

ORIGINAL ARTICLE

Turkish validity and reliability of the Activities of Daily Living Evaluation in Schoolchildren (ADL-E) Questionnaire

Okul Çocuklarında Günlük Yaşam Aktivitelerini Değerlendirme (GYA-Okul Çocukları) Anketinin Türkçe geçerlilik ve güvenilirliği

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Abstract

Purpose: Activities of Daily Living- Schoolchildren (ADL-E) Questionnare is designed to assess activities of daily living in school-age children. The aim of study was to investigate the validity and reliability of the Turkish version of the ADL-E Questionnare.

Methods: This study is a metadological research. The parents of 412 children with typical development between the ages of 6 and 12 participated in the study. The ADL-E Questionnaire includes four different scales: three for basic activities of daily living, such as eating (20 questions), personal hygiene (29 questions) and clothing (17 questions), and one for general functionality (18 questions), which assesses the cognitive aspects required for performing basic activities of daily living. The questionnaire contains 84 questions in total. Construct validity was determined using exploratory and confirmatory factor analysis. Internal consistency was examined using Cronbach's α coefficient. The test–retest reliability of the ADL-E subscale scores were assessed using the intraclass correlation coefficient (ICC).

Results: The mean age of the children was 9.51±1.40 years. 205 girls and 207 boys. Construct validity analysis revealed that the ADL-E had adequate fit. The Cronbach's α coefficient value of the ADL-E Questionnaire was excellent (0.816) for the overall questionnaire. Except for the oral sensitivity and executive functions sub-items, all values in the sub-item-total correlation results were greater than 0.30. The test-retest values of the ADL-E Questionnaire were between 0.755-0.949.

Conclusion: The ADL-E Questionnaire was found to be valid and reliable in Turkish for the assessment and monitoring of ADL performance of Turkish children.

Keywords: Activities of daily living, Child health, Executive functions.

Öz

Amaç: *Günlük Yaşam Aktiviteleri- Okul Çocukları (GYA-Okul Çocukları) Anketi, okul çağındaki çocukların günlük yaşam aktivitelerini değerlendirmek için tasarlanmıştır. Çalışmanın amacı, GYA-Okul Çocukları Anketi'nin Türkçe versiyonunun geçerlilik ve güvenilirliğini araştırmaktı.*

Yöntem: *Bu çalışma metadolojik bir araştırmadır. Çalışmaya 6-12 yaş aralığında tipik gelişim gösteren 412 çocuğun ailesi katıldı. GYA-Okul Çocukları Anket'i dört farklı ölçek içermektedir: üçü yemek yeme (20 soru), kişisel hijyen (29 soru) ve giyim (17 soru) gibi temel günlük yaşam aktiviteleri için ve biri de temel günlük yaşam aktivitelerini gerçekleştirmek için gereken bilişsel yönleri değerlendiren genel işlevsellik (18 soru). Ankette toplam 84 soru bulunmaktadır. Yapı geçerliliği, açıklayıcı ve doğrulayıcı faktör analizi kullanılarak belirlendi. İç tutarlılık Cronbach'ın α katsayısı kullanılarak incelendi. GYA-Okul Çocukları Anketi alt ölçek puanlarının test-tekrar test güvenilirliği sınıf içi korelasyon katsayısı kullanılarak değerlendirildi.*

Bulgular: *205 kız ve 207 erkek çocuğun yaş ortalamaları 9,51±1,40 idi. Yapı geçerliliği analizi GYA-Okul Çocukları Anketi'nin yeterli uyuma sahip olduğunu ortaya koydu. GYA-Okul Çocukları Anketi'nin Cronbach α katsayı değeri anketin geneli için mükemmeldi (0,816). Ağız hassasiyeti ve yürütücü işlevler alt maddeleri hariç, alt madde-toplam korelasyon sonuçlarındaki tüm değerler 0,30'dan büyüktü. GYA-Okul Çocukları Anketinin test-tekrar test değerleri 0,755-0,949 arasındaydı.*

Sonuç: *GYA-Okul Çocukları Anketi Türk çocuklarının GYA performansının değerlendirilmesi ve izlenmesi için Türkçe geçerli ve güvenilir bulundu*

Anahtar Kelimeler: *Günlük yaşam aktiviteleri, Çocuk sağlığı, Yürütücü işlevler.*

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Received: July 5, 2024. Accepted: December 29, 2024.

INTRODUCTION

Activities of daily living (ADL) are defined as a set of activities that are essential for an individual to both survive and participate in society.[1] According to the 'International Classification of Function (ICF)', ADL in the "Activity and Participation" field is defined as vital functions required for self-care such as eating, bathing, self-care, and housework.[2]

ADLs begin with basic ADLs such as eating, dressing, and toileting in infancy, and in later ages such as childhood and adolescence, activities of daily living are included in these activities, and newly learned activities are acquired throughout life. Good performance in daily living activities, particularly in childhood and early adolescence, becomes increasingly important in terms of an individual's ability to realize independence, self-sufficiency, and social participation.[3-7] People also need cognitive processes such as executive function and self-regulation while performing ADLs.[8,9] Executive functions are critical in dealing with internal and external problems and facing new situations.[10,12] Therefore, appropriate executive functions are necessary for the realization of activities of daily living in which we continuously plan and sequence, focus and organize, and solve problems.[13-15] Self-regulation refers to the ability to manage attention, emotions, and reactions to perform goal-directed behaviors. Self-regulation is necessary for eating, dressing, bathing, sleeping, and learning.[16,17] As a result, a broad range of ADLs is essential because it is necessary to identify the difficulties children face while performing ADLs and to have a complete understanding of these difficulties in order to support them when they require assessment and intervention.[18]

In Turkey, the tests employed to assess and monitor Turkish children's performance in activities of daily living are limited. The Pediatric Evaluation of Disability Inventory (PEDI) and the Functional Independence Measure for Children (WeeFIM) are the most commonly utilized instruments in this context. The PEDI is a long scale consisting of 197 items to evaluate the performance of children aged between 6 months and 7.5 years.[19] WeeFIM shows children's levels in activities of daily living but is said to be insensitive to interventions and changes over time. This, therefore, complicates the prediction of children's development. Furthermore, special training is required to apply WeeFIM.[20,21]

Given these difficulties, this study aims to add a scale that researchers working in this field can use to evaluate children's activities of daily living to the literature by conducting Turkish validity and reliability of the ADL-E questionnaire. The study has two hypotheses. The first one is to verify the construct validity of the ADL-E questionnaire and the second hypothesis is that the ADL-E questionnaire is reliable.

METHODS

In order to conduct the study, permission to translate the questionnaire into Turkish and use it in the research was obtained from the responsible author who developed the questionnaire in April 2022. The study was conducted with the approval decision of Çankırı Karatekin University Ethics Committee at its meeting dated 28.06.2022 and numbered 26 with the verification code 0673005c275c4f17 and was conducted in accordance with the Declaration of Helsinki.

Wild et al.'s methods and recommendations were used in the translation and cross-cultural adaptation of the Activities of Daily Living Evaluation in Schoolchildren Questionnaire, whose original language was Spanish.[22] The questionnaire was first translated into Turkish by certified translators who are native Spanish speakers. These two translations were then compared, and the Turkish version of the questionnaire was developed by two physiotherapists with experience in the assessment and intervention of activities of daily living clinically. The Turkish version of the questionnaire was then translated into Spanish, considering the Turkish sociocultural structure. In the semantic adaptation of the ADL-E Questionnaire, the word "elbise (getting dress)" in the third section was changed to "giyim (clothing)" to address both boys and girls and the sub-headings "giysilerin izole edilmiş görevleri (independent clothing task)" and "giysi tamamlamak (full clothing)" were adopted as the agreed final version. The questionnaire was

administered to the families of 10 children and no difficulty was observed in understanding any questions during the administration.

Participants

The study was conducted with 412 children and their families residing in Çankırı province. Children with typical development, no chronic diagnosis or disease history, and no regular medication use were included in the study. After the necessary permissions were obtained, schools were contacted, and families were reached. The aims and procedures of the study were explained to the families and informed consent was obtained from them.

ADL-E in Schoolchildren Questionnaire

Activities of Daily Living Evaluation in Schoolchildren

This questionnaire was designed to assess activities of daily living in school-age children aged 6-12 years. The questionnaire includes four different scales in total: three for basic activities of daily living, such as Eating, Personal Hygiene and Getting Clothing, and one for General Functionality, which assesses the cognitive aspects required for performing basic activities of daily living. The questionnaire contains 84 questions in total and 6 additional special questions for girls. The evaluation is based on 84 items.

The Eating scale consists of 20 questions divided into subheadings of Manual Dexterity while eating (6 questions), Proprioception (4 questions), Oral Sensitivity (3 questions), and Good Manners while mealtime (7 questions). This section focuses on children's food and drink selection, manipulation, and chewing, as well as the observance of dining etiquette.

The Personal Hygiene scale consists of 29 questions divided into subheadings of Hygiene and Grooming (18 questions), Toilet Needs Communication (2 questions), Bladder and Bowel Control (4 questions), and Showering (5 questions). This section of the questionnaire is designed to assess children's knowledge of personal care, such as washing, brushing teeth, showering, the need to use the toilet, the use of personal hygiene materials and cosmetics, and sphincter control. This section also includes 6 questions specific for girls on hairstyle and menstruation.

In the Getting Clothing scale, there are 17 questions in total, including the sub-headings of Independent Clothing Tasks (13 questions) and Full Clothing (4 questions). This section includes questions on dressing and undressing, including clothing, selection, and adjustment of accessories and footwear.

In the General Functioning scale, there are 18 questions in total, including subheadings of Executive Functions (8 questions) and Self-Regulation (10 questions).

The ADL-E Questionnaire is completed by interviewing the child's caregiver or parent. The caregiver or parent has to choose one of 4 answers (3= always, 2= sometimes, 1= never, 0= don't know/no opportunity) to answer the questionnaire according to the behaviors they observe in their children. The total score of the 4 subscales of the questionnaire is calculated separately.

Statistical analysis

The number of participants was determined by the calculation of power analysis with G* power, where 0.05 was the α and 80% power value for 402 children. The study was completed using SPSS Statistics 26.0 to analyze the data. Data on measurable variables were expressed as mean ±and standard deviation (x±SD), and data on categorical variables were expressed as numbers and percentages. Demographic features were taken and the validity and reliability of the Turkish version of the ADL-E was examined. Differences were assessed as significant with an α value of 0.05. Reliability and validity analyses were performed according to the COSMIN (COnsensus-based Standards for the selection of health status Measurement Instruments) Guidelines.[23] The Kaiser- Meyer- Olkin and Bartlett's sphericity tests were used as indices of sampling adequacy.[24] The minimum acceptable KMO result was considered as 0.6. The model fitting indices including CMIN/DF, Goodness-of-Fit Index (GFI), Comparative Fit Index (CFI), Normed Fit Index (NFI), and RMSEA statistics were used. These values were accepted as acceptable if the scores were between 0.05 and 1.0 for RMSEA and higher than 0.90 for fit indices.[25] The reliability of the subheadings of the Activities of Daily Living Evaluation in Schoolchildren Questionnaire was determined by Cronbach's alpha and the item-total correlation (ITC) values were calculated to determine internal consistency. To determine test–retest reliability, the intra-class correlation coefficients (ICCs) were calculated. Values of 0.7

for Cronbach's alpha, 0.5 for ICC, 0.20 for ITC are considered as minimum acceptable values.[26,27]

RESULTS

Demographic characteristics of the individuals

Parents of 412 children, 205 girls, and 207 boys, were administered a questionnaire. In the study conducted with the parents of children between the ages of 6-12, it was observed that the mean age of the children was 9.51±1.40 years. The mean Body Mass Index of the children in the study was 18.52±3.54 kg/m^2. The mean age of the mothers of the children was 36.89±5.10 years and the mean age of the fathers was 40.34±5.33 years. The majority of mothers were high school graduates (39.81%), while the majority of fathers were university graduates (44.66%). The socio-demographic characteristics of individuals who participated in the study are given in Table 1.

Table 1. Demographic properties of the participants (N=412).

	X±SD
Age (year)	9.5±1.4
Body mass index (kg/m^2)	18.5±3.5
Mother's age (year)	36.9±5.1
Father's age (year)	40.3±5.3
	n (%)
Gender	
Female	205 (49.8)
Male	207 (50.2)
Mother's Education	
Primary School	43 (10.4)
Middle School	46 (11.2)
High School	164 (39.8)
University	154 (37.4)
Father's Education	
Primary School	26 (6.3)
Middle School	51 (12.4)
High School	142 (34.5)
University	184 (44.7)

Construct validity

The construct validity of the Turkish version of the ADL-E was tested with the exploratory (EFA) and confirmatory factor analysis (CFA). For Eating scale, KMO value of 0.766, and Bartlett's test, p <0.001; for Personel Hygiene scale, KMO value of 0.748, and Bartlett's test, p<0.001; for Getting Clothing scale, KMO value of 0.747, and Bartlett's test, p<0.001; for General Functioning scale KMO value of 0.856, and Bartlett's test, p<0.001 were all good enough to carry out the explatory factor analysis.

The calculated fit indices values for the Eating scale were: X2/df = 1.783, p= 0.00, GFI = 0.931, CFI = 0.904, NFI = 0.908, and RMSEA = 0.044; for the Personal Hygiene scale X2/df = 1.564, p=0.00, GFI = 0.868, CFI = 0.898, NFI = 0.890, and RMSEA = 0.042; for the Getting Clothing scale X2/df = 2.029, p= 0.00, GFI = 0.907, CFI = 0.894, NFI = 0.920, and RMSEA = 0.069; for the General Functioning scale X2/df = 1.812, p= 0.00, GFI = 0.937, CFI = 0.918, NFI = 0.901, and RMSEA = 0.044. According to the CFA statistics, the Turkish version of the ADL-E demonstrated an acceptable fit (Table 2).

Internal consistency

The Cronbach's α coefficient value of the Turkish version of the ADL-E questionnaire was excellent (0.816) for the overall questionnaire. The reliability levels of the sub-headings of the questionnaire were good for manual dexterity while eating (0.718), proprioception (0.614), oral sensitivity (0.662), good manners while mealtime (0.669), hygiene and grooming (0.792), bladder and bowel control (0.702), independent clothing tasks (0. 740), full clothing (0.714), executive functions (0.708), and self-regulation (0.740), showering (0.841), and toileting needs communication (0.338). Except for the oral sensitivity and executive functions sub-items, all values in the sub-item-total correlation results were greater than 0.30 (Table 3).

Test-retest reliability

Test-retest was administered to 74 individuals at two-week intervals. The ICC values of the Turkish version of the ADL-E questionnaire were between 0.755-0.949 (Table 4). In the sub-headings of the questionnaire, the highest ICC values were found in the self-regulation sub-heading (0.954) and the lowest in the full clothing sub-heading (0.755).

DISCUSSION

As a result of the study, the ADL-E questionnaire was found to be valid and reliable in Turkish for the evaluation and monitoring of

Table 2. The Activities of Daily Living Evaluation Schoolchildren (ADL-E) goodness-of-fit indices.

	Cutoff	Eating Scale	Personal Hygiene Scale	Getting Clothing Scale	General Functioning Scale
Chi-squared probability p (x^2)	>0.05	0.00	0.00	0.00	0.00
Goodness-of-Fit Index (GFI)	>0.90	0.931	0.868	0.907	0.937
Comparative Fit Index (CFI)	>0.90	0.904	0.898	0.894	0.918
Root Mean Square Error of Approximation (RMSEA)	<0.08	0.044	0.042	0.069	0.044
Normed Fit Index (NFI)	>0.90	0.908	0.890	0.920	0.901

Table 3. Internal consistency (item-total correlations and Cronbach's α coefficients) of the Turkish version of the Activities of Daily Living Evaluation Schoolchildren (ADL-E) (N=412).

	Mean±SD	Item-total correlation (r)	Cronbach's α
Eating Scale (0-60)	51.73±4.35		0.699
Manual Dexterity while Eating (0-18)	15.41±2.34	0.793	0.718
Proprioception (0-12)	10.62±1.81	0.623	0.614
Oral Sensitivity (0-9)	5.59±1.38	0.259	0.662
Good Manners while Mealtime (0-21)	19.82±1.45	0.565	0.699
Personal Hygiene Scale (0-87)	82.92±5.57		0.791
Hygiene and Grooming (0-54)	33.51±2.48	0.888	0.792
Toileting Needs Communication (0-6)	5.91±0.34	0.271	0.338
Bladder and Bowel Control (0-12)	8.82±0.80	0.305	0.702
Showering (0-15)	14.76±0.86	0.448	0.841
Getting Clothing Scale (0-51)	48.48±3.69		0.754
Independent Clothing Tasks (0-39)	31.61±1.90	0.946	0.740
Full Clothing (0-12)	11.88±0.47	0.415	0.714
General Functioning Scale (0-54)	36.59±3.55		0.606
Executive Function (0-24)	22.28±2.00	0.290	0.708
Self-Regulation (0-30)	14.08±3.47	0.767	0.796
Total			0.816

Table 4. Test–retest correlations of the Activities of Daily Living Evaluation Schoolchildren (ADL-E).

	Test (Mean±SD)	Retest (Mean±SD)	ICC (95% CI)
Manual dexterity while eating	15.41±2.34	15.35±2.32	0.947 (0.918-0.966)
Proprioception	10.62±1.81	10.73±1.69	0.904 (0.851-0.938)
Oral sensitivity	5.59±1.38	5.68±1.31	0.836 (0.752-0.894)
Good manners while mealtime	19.82±1.45	19.78±1.40	0.889 (0.829-0.928)
Hygiene and grooming	33.51±2.48	33.31±2.38	0.949 (0.920-0.968)
Toileting needs communication	5.91±0.34	5.91±0.34	0.880 (0.816-0.923)
Bladder and bowel control	8.82±0.80	8.81±0.82	0.948 (0.919-0.967)
Showering	14.76±0.86	14.73±0.76	0.855 (0.779-0.906)
Independent clothing tasks	31.61±1.90	31.30±1.89	0.928 (0.887-0.954)
Full clothing	11.88±0.47	11.91±0.34	0.755 (0.637-0.838)
Executive function	22.28±2.00	22.19±1.92	0.903 (0.851-0.938)
Self-regulation	14.08±3.47	14.28±3.31	0.954 (0.927-0.970)

ICC: Intra Class Correlation Coefficient. CI: confidence Interval.

Turkish children's performance in ADL.

Statistical analyses revealed the construct validity of the ADL-E questionnaire for the assessment and monitoring of activities of daily living in Turkish school-age children in several domains. These results were similar to the original study.

The results of the analysis conducted by the authors of the questionnaire show that the reliability of the sub-headings of the questionnaire is excellent and good. The findings of current study showed that all sub-headings of the questionnaire, except for the toileting needs communication sub-heading, were excellent and good, in line with the findings of the main study. Toilet training is one of the most important basic life skills that a child must master. Toilet training is influenced by the child's chronological age, language development, physical and mental development, as well as cultural differences, sociodemographic characteristics, and parental education level.[28] The low reliability of the toilet needs communication sub-heading of the ADL-E questionnaire may be attributed to two reasons. First, the mean age of the children who participated in this study was higher compared to the participants in the original study. The other reason is that, while it is widely assumed that children complete toilet training between the ages of 2-3 years worldwide, studies have shown that in Türkiye, toilet training begins earlier and is completed between the ages of 2-2.5 years.[29,30] The older age group of the children in this study, as well as the fact that the participants had already learned and completed the activities under this heading since toilet training begins and is completed at a younger age in Turkish culture, may explain the low reliability of the toileting needs communication subheading in the ADL-E Questionnaire.

The age range of 6 to 12 years is a period of rapid growth and development in children, during which the foundation for lifelong behaviors is formed. During this period, children begin to spend most of the day at school, and participation in social activities increases. Most behavioral problems related to eating begin in this age group and eating becomes a social activity. When studies in this age group are examined, irregular eating, excessive snacking, following popular diet trends, and skipping meals are among the most commonly observed eating habits in children in this age group.[30-32] Furthermore, in studies[33-36] and in a study conducted in Turkey[37], it has been reported that families tend to misperceive the eating and weight status of children. The total score correlation result of the oral sensitivity subheading of the ADL-E Questionnaire was found to be low (<0.30) in present study, unlike the main study. Other studies in the field suggest that this finding could be due to children developing bad eating habits as a result of various factors during the school year, or that families' perceptions of children's eating behaviors are incorrect.

In this study, another sub-heading with a low correlation (0.30) between sub-heading total scores was executive functions. It was thought that the protective family structure in Turkish culture may be effective in the emergence of this result. Parental support is generally accepted as positive for the child's development.[38] However, recent studies suggest that parents have recently changed from a supportive approach to an overly intrusive one. This may interfere with the child's learning and development and is reported to cause problems, especially in decision-making, academic studies, and social relationships.[19,39]

It was also observed that the test-retest results of this study were at a good level. This indicates that this study is consistent.

The ADL-E Questionnaire is a test in which activities of daily living in school-age children are questioned in a therapist-parent/caregiver interview. Its benefits included the fact that it does not require a special environment and could be applied quickly. However, it is also beneficial for the therapist to observe the child performing the activity in natural or simulated environments during ADL assessments. This is because it is possible to determine whether the child requires assistance in carrying out the activity, and if so, where and how much assistance they require. In the case of ADL analysis via questionnaires, it can be difficult to determine where the need arises and how much assistance is required. Some of the questionnaire questions, such as showering and dressing, do involve privacy, and families may be unaware of such questions. However, implementing these topics in a simulation environment can be equally challenging. In

addition to being a questionnaire consisting of basic ADLs such as dressing, eating and self-care, this questionnaire is thought to have advantages such as containing six items for girls, including activities that reflect the ADL of children's physiological conditions that change with age, and allowing questioning in many areas of ADL related to oral sensitivity such as proprioception such as opening pressurized lids and questioning textured foods. However, it was observed during the administration that girls were hesitant to answer questions about girls due to privacy concerns. It was also believed that the families' high level of education helped comprehension of the questionnaire while administering the Turkish version of the questionnaire. It was also observed that the majority of the children who participated in the questionnaire were second and third children. This suggested that this may be the reason why children are more successful in the ADL in which the first acquisitions are formed in the family environment due to the role models or guiding people such as older sisters/brothers.

The study was conducted according to COSMIN, which is very important for standardisation in reliability and validity studies. Furthermore, the study presented the daily living activity performances of children aged 6-12 years, incorporating cognitive development dimensions across a range of areas, including eating and dressing. These factors constituted the strengths of present study.

Limitations

The lack of concurrent validation of the ADL-E Questionnaire was a limitation of study. This is because the PEDI questionnaire does not have the same age range as the ADL-E questionnaire. Training is required to be able to administer WeeFIM. For these reasons, the concurrent validity of the ADL-E questionnaire could not be performed. In future studies, it is planned to expand the study by performing the study in children with different diagnostic groups. (cerebral palsy, attention hyperactivity disorder etc.)

Conclusion

The ADL-E Questionnaire is an easy, valid and reliable questionnaire for assessing and monitoring the performance of school-age Turkish children in activities of daily living without the need for any additional tools. The most important feature of the questionnaire is that it also measures the cognitive functions necessary for the realization of activities of daily living. It is thought that the questionnaire will be useful for people working in this field.

Acknowledgement: *None*

Authors' Contributions: NŞ: design, data collection, analysis and interpretation of data, literature research, writing the manuscript; **SAU:** design, data collection, analysis and interpretation of data, literature research, writing the manuscript; **MYG:** literature research, writing the manuscript; **YY:** analysis and interpretation of data.

Funding: *None*

Conflicts of Interest: *None*

Ethical Approval: The protocol of the present study was approved by Çankırı Karatekin University Ethics Committee (issue: 26 date: 28.06.2022).

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