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THE CULTURAL ADAPTATION, VALIDATION, AND RELIABILITY OF THE TURKISH VERSION OF THE LIFE SPACE ASSESSMENT

ORIGINAL ARTICLE

ABSTRACT

Purpose: The aim of this study was to determine the reliability and validity of the Turkish version of the Life Space Assessment (LSA) in older adults.

Methods: A hundred fifty-two elderly people with a mean age was 72.81±7.63 years recruited to the study. Following the forward-backward translation procedure, the LSA scores were compared with a number of mobility and general health related variables, including the Physical Activity Scale for the Elderly (PASE) and the 36-Item Short Form Health Survey (SF-36) to test the concurrent validity.

Results: None of the items in the LSA were changed. Cronbach's α coefficient was 0.714 for the initial evaluation. The intraclass correlation coefficient for the test-retest reliability was 0.991 with a 95% confidence interval of 0.986–0.994. It found that the highest consistence was obtained in the equipment scores. All the subscores of LSA found to have a significant relationship with PASE scores and SF-36 subscores. A very strong positive correlation found between the total score of LSA and PASE (r = 0.896). Similarly, a very strong correlation observed between SF-36's subscore physical function, and LSA composite score (r = 0.841).

Conclusion: The results of the study showed that the Turkish version of LSA has strong measurement features and that the LSA is a sensitive tool for assessing the life domains of elderly individuals related to their general health and physical activity level. Therefore, the Turkish version of the LSA could be used as a reliable and valid scale in research and practice areas related to elderly people.

Key Words: Activities of Daily Living, Aged, Health, Life Space Assessment

YAŞAM ALANI DEĞERLENDIRME ÖLÇEĞİ'NİN TÜRKÇE VERSİYONUNUN GEÇERLİK VE GÜVENİRLİK ÇALIŞMASI

ÖZ

ABSTRACT

Amaç: Bu çalışmanın amacı, yaşlı yetişkinlerde Yaşam Alanı Değerlendirme (LSA) Türkçe versiyonunun güvenilirliğini ve geçerliliğini belirlemekti.

Yöntem: Çalışmaya ortalama yaşı 72,81±7,63 olan yüz elli iki yaşlı birey alındı. İleri-geri çeviri işlemini takiben, LSA skorlarının eşzamanlı geçerliliğini test etmek için Yaşlılar İçin Fiziksel Aktivite Ölçeği (PASE) ve 36 Maddeli Kısa Form Sağlık Anketi (SF-36) dâhil olmak üzere bir dizi hareketlilik ve genel sağlıkla ilgili değişkenler ile karşılaştırıldı.

Sonuçlar: LSA'daki maddelerin hiçbiri değiştirilmedi. İlk değerlendirme için Cronbach α katsayısı 0,714 idi. Test-tekrar test güvenilirliği için sınıf içi korelasyon katsayısı 0,991 ve % 95 güven aralığı 0,986-0,994 idi. En yüksek tutarlılığın ekipman puanlarında elde edildiği gözlendi. LSA'nın tüm alt puanlarının PASE puanları ve SF-36 alt puanları ile anlamlı bir ilişkisi olduğu bulundu. LSA ve PASE'in toplam puanları arasında çok güçlü bir pozitif korelasyon bulundu (r = 0,896). Benzer şekilde, SF-36'nın alt fiziksel fonksiyon ile LSA kompozit puanı arasında çok güçlü bir korelasyon gözlendi (r = 0,841).

Tartışma: Çalışmanın sonuçları, LSA'nın Türkçe versiyonunun güçlü ölçüm özelliklerine sahip olduğunu ve LSA'nın yaşlı bireylerin genel sağlık ve fiziksel aktivite düzeyleri ile ilgili yaşam alanlarını değerlendirmek için hassas bir araç olduğunu göstermiştir. Bu nedenle LSA Türkçe versiyonu yaşlı bireylerle ilgili araştırma ve uygulama alanları için geçerli ve güvenilir bir ölçek olarak kullanılabilir.

Anahtar Kelimeler: Günlük Yaşam Aktiviteleri, Yaşlı, Sağlık, Yaşam Alanı Değerlendirme

INTRODUCTION

Reduction and limitation of mobility is a common condition in the elderly. Compared to the general population, mobility restriction for older individuals rises to 15.4% for those aged 50-69 years and to 36.2% for those aged over 70 years (1). Mobility has both direct and indirect consequences for all older adults in terms of independence and autonomy (2).

The focus of these assessment approaches often include the assessment of walking, stair handling, and balance assessment, or determining the risk of falling (3-5). In addition, daily living activities of individuals such as bathing, dressing, eating, or other daily living activities such as shopping and social interaction are used by physiotherapists and clinicians to assess mobility (6-8). However, traditional mobility measures used in the elderly focus only on specific daily activities and evaluate activities of daily living, instrumental activities in daily life, walking ability, or walking speed. (9) These approaches provide information regarding the motor function and coordination required for mobility, whereas they cannot precisely determine individuals' ability to move from home to his/her own neighborhood or from the neighborhood towards the larger community.

To date, numerous life space scales have been developed to evaluate the movement of individuals to the neighborhood or beyond the city. These scales are different from classical mobility assessments which do not take into account the interaction with the living environment (8, 10). Living space is defined as the spatial space (bedroom, home, outside the home, neighborhood, town, remote locations) where the individual consciously moves in his/her daily life, and living space mobility assesses the frequency of mobility in a given time and evaluates the independence status for this mobility (10). To guide and evaluate mobility-related interventions, it is essential to learn more about the mobility of older people or factors related to mobility limitations. For these purposes, valid tools for measuring mobility are vital. Therefore, unlike other assessment methods, there is a need for a Turkish assessment tool that evaluates the living space of elderly individuals and evaluates the frequency of these changes.

Various measurement tools are available in the literature for the evaluation of living space mobility (3, 10-12). Of these, Life Space Assessment (LSA) is the most comprehensive assessment tool focusing on the frequency and independence of mobility to different areas that define spatial changes from the individual's bedroom to the mobility outside the city where he/she lives (8, 10, 11). To date, LSA has been converted to several versions including French-Canadian (13), Swedish (3), Japanese (14), Danish (15), Spanish, and Portuguese (16). However, to our knowledge, no Turkish version of LSA has been established to date. Accordingly, the present study was designed to translate LSA into Turkish and to investigate the validity and reliability of its Turkish version as well as its cultural adaptation.

METHODS

Participants

A total of 152 participants with a mean age of 72.1 volunteered to participate in the study. Inclusion criteria were as: age ≥65 years, Turkish-speaking and Mini-Mental State Examination (MMSE) score ≥24. Exclusion criteria were as follows: severe psychiatric disorders (e.g. schizophrenia, major depressive disorder, and delirium), acute respiratory/circulatory disorder, and orthopedic injury affecting gait during the 2-week period before the survey. Informed consent was obtained from all participants. The study was conducted in accordance with the Helsinki Declaration and was approved by the Non-Interventional Ethics Committee of Fırat University (28.01.2019, 308442). In addition, the study was prospectively recorded in ClinicalTrials.gov (NCT03839927)

Study procedure

To determine the validity and reliability of a Turkish version of the LSA, this study was conducted in Elazığ and Denizli between March 2019 and January 2020. Participants were obtained from the records of family practice centers in the relevant provinces. Before the home visits, the participants were informed by phone and trained physiotherapists interviewed the participants using the Life Space Assessment. 5 to 7 days later, at the home visit, the participants were asked to repeat the question-

naire for test-retest. The study design a prospective, methodological and cross-sectional. The data were collected by face-to-face interview technique. All the study procedures and measurements were performed in a single session. The LSA scores were compared with a number of mobility and general health-related scales including the Physical Activity Scale for the Elderly (PASE) and the 36-Item Short-Form Health Survey (SF-36) to test the concurrent validity of LSA. For this purpose, Turkish versions of SF-36 and PASE were used. Clinical conditions of the individuals were assumed to be unchanged within this period. In order to minimize the risk of short-term clinical changes in the participants, no treatment was given throughout this period.

Cross-cultural adaptation and linguistic validity

Permission to use the original LSA questionnaire was obtained from Patricia Sawyer Baker. The cultural adaptation procedure of LSA was performed in accordance with the principles described in the literature (17). First, the LSA form was translated into Turkish by two interpreters who were Turkish nationals with a high level of proficiency in English. Both the interpreters and authors compared the translations and formed a Turkish version that best represented the original form. Afterward, the translation was piloted with two elderly individuals to assess its linguistic intelligibility and appropriateness. The second meeting was performed to form a consensus on the necessary changes and it was decided that there was no need for cultural adaptation. Secondly, the Turkish form of LSA was back-translated into English by two native English interpreters who were blinded to the study. In the third step, the two back-translation forms were synthesized and compared with the original LSA form by the authors. Finally, the Turkish version, the back-translated form, and the original LSA form were compared by a multidisciplinary team including physiotherapists, in order to detect the inconsistent parts within the text and to ensure semantic and conceptual equivalence. After a series of small alterations and corrections, a consensus was reached by the team, which was approved by Patricia Sawyer Baker. Ultimately, the final Turkish version of the LSA was obtained and a second pilot study was performed with 10 elderly individuals.

Outcome measures

Sociodemographic characteristics such as age, gender, height, body weight, body mass index, marital status, employment status, residential area, accessibility to living area, transportation to the place of residence, length of time in the neighborhood, use of auxiliary devices, living alone or not, and educational and income levels were recorded using a demographic information form during a semi-structured interview.

An MMSE form was developed to evaluate cognitive functions. The highest achievable score was 30 and scores below 24 showed cognitive impairment in people aged over 65 years (18).

Life Space Assessment (LSA) consists of five questions examining respondents' levels of living space: "During the past four weeks, have you been to other rooms in your home besides the room where you sleep (level 1); to an area outside of your homes such as your porch, deck or patio, hallway of an apartment building, or garage (level 2); to places in your neighborhood other than your own yard or apartment building (level 3); to places outside your neighborhood but within your town (level 4); and to places outside your town (level 5)". For each level, the respondent was questioned about the frequency ("less than once a week, 1-3 times, 4-6 times, or daily") and the need of help from another individual (yes or no) or using aids or equipment (yes or no) (8).

A composite LSA score (LSA-C) was calculated based on (i) life space levels, (ii) frequency of attaining each level, and (iii) degree of independence to achieve each level. These three LSA subscores were calculated as suggested by the original validation study. Maximal Living Area (LSA-M) represents the highest living level achieved even if equipment or assistance was used; Independent Living Space (LSA-I) is the highest level of living space achieved without the help of a person and without using any equipment; and the highest level of living space (LSA-E) is achieved by using equipment. The LSA-M, LSA-I, and LSA-E scores ranged from 0 to 5 and higher scores indicated greater levels of life space (14).

Physical Activity Scale for the Elderly (PASE) is

a self-administered questionnaire designed for people aged over 65 years. PASE consists of 12 questions examining the duration, intensity, and frequency of physical activity performed over a seven-day period. Higher scores indicate better levels of physical activity. Cronbach's α coefficient was 0.714 for the initial evaluation of the Turkish version of PASE. The intraclass correlation coefficient for the test-retest reliability was 0.995 with 95% CI (0.993-0.997) (19).

The 36-Item Short-Form Health Survey (SF-36) is generally used to evaluate the quality of life and general health status of individuals. SF-36 consists of 36 items divided into eight subscales, with 2-10 items each. In the evaluation of SF-36, the last four weeks in the life of respondents were taken into consideration. Lower SF-36 scores indicate worse health conditions (20).

Statistical analysis

All statistical analyses were performed using SPSS for Windows version 25.0 (IBM SPSS, Armonk, NY: IBM Corp.). Continuous data were expressed as mean ± standard deviation (SD) and categorical variables were expressed as frequencies (f) and percentages (%). A wide range of recommendations regarding optimal sample size for factor analysis exists in the literature. We used a sample size approach that is at least 5-10 times larger than the number of scale items, which is one of the most recommended and supported recommendations (21, 22). According to this approach, there should be at least between 5 to 10 participants for each item in the instrument. Our study was carried out with 152 participants for a total of 15 items since there were 3 questions in each of the 5 sub-dimensions of the LSA.

Concurrent validity analysis was used to investigate the validity of the LSA in older individuals. For convergent validity, the relationship between the PASE, and SF-36 was evaluated with the Spearman correlation test. Correlations were considered negligible if between 0 and 0.20, weak if 0.21–0.40, moderate if 0.41–0.60, strong if 0.61–0.80, and very strong if 0.81–1.00 (23).

The test-retest reliability of the questionnaire was evaluated based on the intraclass correlation coefficient (ICC). The ICC values were identified as fair for <0.40, moderate for 0.40–0.59, substantial for 0.60–0.79, and excellent for ≥0.80 (24). The validity of LSA evaluated by content validity was evaluated with PASE and SF-36 and was analyzed using Spearman's correlation coefficient. For construct

Table 1. Clinical Characteristics

	Mean ± SD (n = 152)	**Min - Max**
Age (years)	72.81 ± 7.63	65 - 96
BMI (kg/m²)	27.76 ± 5.37	17.30 – 42.10
Duration of Life in the Neighborhood (years)	29.40 ± 22.57	1 - 80
LSA-M	3.63 ± 1.16	1 - 5
LSA-E	0.82 ± 1.27	0 - 4
LSA-I	3.27 ± 1.56	0 - 5
LSA-C	46.10 ± 17.21	11 - 84
PASE	231.39 ± 106.19	0 - 514
SF-36		
Physical functioning	54.90 ± 27.64	5 - 100
Role - physical	40.13 ± 41.41	0 - 100
Role - emotional	53.29 ± 46.20	0 - 100
Vitality	47.47 ± 24.72	10 - 95
Mental health	69.11 ± 17.15	20 - 100
Social functioning	62.57 ± 29.39	0 - 100
Bodily pain	60.99 ± 25.52	0 - 100
General health	55.05 ± 18.55	5 - 95

BMI: Body Mass Index, LSA-M: Maximum life-space, LSA-E: Maximum life-space with equipment, LSA-I: Maximum independent life-space, LSA-C: Composite life-space, PASE: Physical Activity Scale for the Elderly, SF-36: 36-item short-form health survey.

Table 2. Reliability of the LSA Scores

	Test		Re-Test		Difference		p	ICC (95% CI)
	Mean± SD	(min/max)	Mean± SD	(min/max)	Mean± SD	(min/max)		
LSA-M	3.62 ± 1.14	(1 - 5)	3.59 ± 1.12	(1 - 5)	0.03 ± 0.23	(-1 - 1)	0.317	0.990 (0.984 – 0.994)
LSA-E	0.82 ± 1.26	(0 - 4)	0.82 ± 1.26	(0 - 4)	0 ± 0	(0 - 0)	-	1 (1 - 1)
LSA-I	3.28 ± 1.51	(0 - 5)	3.26 ± 1.49	(0 - 5)	0.03 ± 0.16	(0 - 1)	0.157	0.997 (0.996 – 0.998)
LSA-C	46.10 ± 17.21	(11 - 84)	45.28 ± 17.62	(11 - 84)	0.53 ± 3.26	(-6 - 24)	0.184	0.991 (0.986 – 0.994)

LSA-M: Maximum life-space, LSA-E: Maximum life-space with equipment, LSA-I: Maximum independent life-space, LSA-C: Composite life-space, ICC: Intraclass correlation coefficient, CI: Confidence interval.

validity, relationships between the sub-dimensions of the scale were examined. A p value of <0.05 was considered significant.

RESULTS

The 152 subjects had a mean age of 72.81 ± 7.63 years, 60.53 % of them were female, 78.29 % of them were living in urban areas, and 69.08% of them were married. Moreover, 88.82 % of them were not working, 65.13 % of them were not using an auxiliary device, and only 21.70% of them were living alone in their home. The mean LSA-C score was 46.10 ± 17.21, mean PASE score was 231.39 ± 106.19, and mean SF-36 general health subscore was 55.05 ± 18.55 (Table 1).

The correlation coefficients obtained based on the test and retest values confirmed that the items of the scale were highly reliable and had a coefficient varying between 0.984 and 1. According to the ICC (and 95% CI), the highest consistency was obtained in the equipment score (r = 1; range, 1-1), while the lowest consistency was obtained in the mobility subscore (r = 0.990; range, 0.984 - 0.994) (Table 2). The test-retest reliability analysis at the level of independence revealed substantial concordance with a trend towards excellent coefficients for the frequency scale at the four independence levels.

All the subscores of LSA were found to have a significant relationship with PASE scores and SF-36 subscores. Of note, the LSA-M, LSA-I, and LSA-C scores established a positive correlation while the LSA-E scores established a negative correlation with the PASE scores and SF-36 subscores (Table 3). In addition, there was a very strong correlation between LSA-M, LSA-I, and LSA-C scores and PASE, while a moderate correlation was found between LSA-E and PASE. Similarly, a very strong correlation was observed between SF-36's subscores, physical function, and LSA-C and LSA-I, while a strong correlation was found between SF-36's subscores, physical function, and LSA-M and LSA-E. (Table 3). (Table 3).

Relationships between all subscores of the LSA

Table 3. LSA Subscores' Relationship with PASE and SF-36 Subscores

		LSA-M		LSA-E		LSA-I		LSA-C	
		r	p	r	p	r	p	r	p
PASE		0.885***	0.001	-0.546***	0.001	0.872***	0.001	0.896***	0.001
SF-36	**Physical functioning**	0.781***	0.001	-0.624***	0.001	0.806***	0.001	0.841***	0.001
	Role - physical	0.390***	0.001	-0.394***	0.001	0.443***	0.001	0.436***	0.001
	Role - emotional	0.188*	0.021	-0.207*	0.010	0.229**	0.005	0.181*	0.025
	Vitality	0.442***	0.001	-0.396***	0.001	0.481***	0.001	0.490***	0.001
	Mental health	0.349***	0.001	-0.305***	0.001	0.392***	0.001	0.389***	0.001
	Social functioning	0.423***	0.001	-0.264***	0.001	0.447***	0.001	0.483***	0.001
	Bodily pain	0.303***	0.001	-0.344***	0.001	0.360***	0.001	0.326***	0.001
	General health	0.500***	0.001	-0.487***	0.001	0.534***	0.001	0.535***	0.001

LSA-M: Maximum life-space, LSA-E: Maximum life-space with equipment, LSA-I: Maximum independent life-space, LSA-C: Composite life-space, PASE: Physical Activity Scale for the Elderly, SF-36: 36-item short-form health survey, r: Pearson's correlation coefficient, *p < 0.05, **p < 0.01, ***p ≤ 0.001

Table 4. Construct Validity of LSA

TEST		LSA-M		LSA-E		LSA-I		LSA-C	
		r	p	r	p	r	p	r	p
LSA-M	r	1.000	-	-0.609*	0.0001	0.966*	0.0001	0.846*	0.0001
LSA-E	r	-	-	1.000	-	-0.752*	0.0001	-0.616*	0.0001
LSA-I	r	-	-	-	-	1.000	-	0.855*	0.0001
LSA-C	r	-	-	-	-	-	-	1.000	-
RETEST		**LSA-M**		**LSA-E**		**LSA-I**		**LSA-C**	
		r	p	r	p	r	p	r	p
LSA-M	r	1.000	-	-0.634*	0.0001	0.980*	0.0001	0.831*	0.0001
LSA-E	r	-	-	1.000	-	-0.755*	0.0001	-0.650*	0.0001
LSA-I	r	-	-	-	-	1.000	-	0.851*	0.0001
LSA-C	r	-	-	-	-		-	1.000	-

LSA-M: Maximum life-space, LSA-E: Maximum life-space with equipment, LSA-I: Maximum independent life-space, LSA-C: Composite life-space, r: Spearman correlation coefficient, *p ≤ 0.0001.

were significant, proving the existence of construct validity. A significant negative strong correlation was found between LSA-M and LSA-E scores. A very strong positive correlation was found between LSA-M and LSA-I and LSA-C scores. A strong negative correlation was found between LSA-E and LSA-I and LSA-C scores. On the other hand, a very strong correlation was observed between LSA-I and LSA-C scores (Table 4).

DISCUSSION

The present study formed a Turkish version of LSA and evaluated its reliability and validity for the first time in the literature. The results demonstrated that the Turkish version of LSA is an effective and sensitive tool with high reliability and validity that could be used to assess the spatial size, frequency, and independence of spatial changes of elderly individuals' living areas. Previous studies investigating the reliability and validity of LSA in different countries reported the mean LSA-C score as 51.9 and 59.6 (16), while it was 46.10 ± 17.21 in our study. This difference could be attributed to the higher age of our subjects as compared to those reported in those studies, which also implicates that the size of living spaces decreases with increasing age. This inverse proportion was also found in our study, as reported in other studies (16, 25, 26). On the other hand, another relationship that supports the role of the social environment on mobility is the relationship between the female gender and LSA. In our study, most of the participants were female and lower LSA-C levels were detected in women than in men. This finding was consistent with the findings of LSA studies investigating gender-based differences (27). Moreover, this difference could be attributed to the social gender (gender roles and socioeconomic disadvantages) rather than the biological gender. In Turkey, gender roles are highly apparent in elderly people, since women are mostly responsible for household chores and men are responsible for out-of-home chores and go to places of worship five times a day. Therefore, women typically have a limited home environment while men have a larger living space.

In our study, the test-retest LSA-M, LSA-E, LSA-I, and LSA-C scores showed excellent test-retest reliability in all parameters of the Turkish version of LSA. These reliability results are quite high compared to other studies in the literature (3, 13, 28). As with surveys that assess physical activity status or behavior, changes in assessment scores may have resulted from variation in normal daily life (29). In our study, short intervals (5 - 7 days) were administered between test and retest evaluations to limit subjects' daily life changes (30). With more leisure time, older people can participate in more out-of-home activities, trips and gain socioeconomic opportunities (31, 32). For this reason, reliable methods will be needed to increase or evaluate the living space mobility of elderly individuals in the future. In our study, the lowest compliance between test-retest results was detected in LSA-C scores. It has been reported that LSA-C has a relatively higher sensitivity potential for changes in life space mobility (26). Accordingly, low compliance in the test-retest analysis can be explained by consid-

YAŞAM ALANI DEĞERLENDIRME ÖLÇEĞİ

İsim:							Tarih:	
Bu sorular sadece son bir ay içerisindeki aktivitelerinizi işaret etmektedir.								
YAŞAM-ALAN SEVİYESİ			**SIKLIK**				**BAĞIMSIZLIK**	**PUAN**
Geçen dört hafta süresince ..... bulundunuz mu?			**Ne sıklıkla oraya gittiniz?**				Yardım yada ekipman kullandınız mı? Başka kişinin yardımına ihtiyacınız oldu mu?	Seviye X Sıklık X Bağımsızlık
Yaşam-Alan Seviye 1... **Uyuduğunuz odanın yanı sıra evinizin diğer odalarında?**	Evet	Hayır	Haftada 1'den az	Haftada 1 - 3 kez	Haftada 4 - 6 kez	Günlük	**1** = Kişisel yardım **1,5** = Yalnızca ekipman	
	1	**0**	**1**	**2**	**3**	**4**	**2** = Ekipman veya kişisel yardım olmadan	*Seviye 1 Puan*
Puan	_____X_____X_____ =							
Yaşam-Alan Seviye 2... **Evinizin dışarısındaki bir alanda; sundurma, balkon veya veranda, koridor (bir apartman binasının), veya kendi bahçenizdeki veya araba yolunuzdaki garaj gibi?**	Evet	Hayır	Haftada 1'den az	Haftada 1 - 3 kez	Haftada 4 - 6 kez	Günlük	**1** = Kişisel yardım **1,5** = Yalnızca ekipman	
	1	**0**	**1**	**2**	**3**	**4**	**2** = Ekipman veya kişisel yardım olmadan	*Seviye 2 Puan*
Puan	_____X_____X_____ =							
Yaşam-Alan Seviye 3... **Kendi mahallenizdeki yerlerde, bahçeniz veya apartman binanız haricinde?**	Evet	Hayır	Haftada 1'den az	Haftada 1 - 3 kez	Haftada 4 - 6 kez	Günlük	**1** = Kişisel yardım **1,5** = Yalnızca ekipman	
	1	**0**	**1**	**2**	**3**	**4**	**2** = Ekipman veya kişisel yardım olmadan	*Seviye 3 Puan*
Puan	_____X_____X_____ =							
Yaşam-Alan Seviye 4... **Mahallenizin dışarısındaki, ama şehrinizin içindeki yerlerde?**	Evet	Hayır	Haftada 1'den az	Haftada 1 - 3 kez	Haftada 4 - 6 kez	Her gün	**1** = Kişisel yardım **1,5** = Yalnızca ekipman	
	1	**0**	**1**	**2**	**3**	**4**	**2** = Ekipman veya kişisel yardım olmadan	*Seviye 4 Puan*
Puan	_____X_____X_____ =							
Yaşam-Alan Seviye 5... **Şehrinizin dışarısındaki yerlerde?**	Evet	Hayır	Haftada 1'den az	Haftada 1 - 3 kez	Haftada 4 - 6 kez	Her gün	**1** = Kişisel yardım **1,5** = Yalnızca ekipman	
	1	**0**	**1**	**2**	**3**	**4**	**2** = Ekipman veya kişisel yardım olmadan	*Seviye 5 Puan*
Puan	_____X_____X_____ =							
							TOPLAM PUAN (EKLE)	*Seviyelerin Toplamı*

ering the changes in the environment and psychosocial factors.

Both LSA and PASE have been shown to be useful indicators of physical function in older adults (19, 25). In our study, a significant relationship was found between LSA subscores and PASE and SF-36 scores. In addition, there was a very strong correlation between LSA-M, LSA-I, and LSA-C scores and PASE scores, while a moderate correlation was found between LSA-E scores and PASE scores. LSA-C score, which evaluates spatial changes, and the frequency and need for help or equipment, was found to have greater variability and to have a greater effect on the area of mobility compared to other subscores. LSA-I score, which provides information on independent mobility without help, also showed a very strong relationship with PASE. In addition, the very strong correlation between LSA-M and PASE suggests that reaching maximal areas in the living space is an indicator of being physically more active. However, unlike other subscores, LSA-E showed a moderate negative correlation with PASE, which could be explained by the need for a detailed investigation of elderly people who need assistive devices or personal assistance for an independent life. Decreased physical activity along with the use of assistive devices is compatible with the literature (33, 34). Therefore, LSA measurements, which assess the use of simple equipment or personal assistance and the frequency of reaching each life space, could be useful tools to assess the mobility levels in the elderly population.

In our study, in a similar way to the studies conducted in different populations, significant relationships were found between LSA subscores and all SF-36 subscores (28, 35). There was quite a small number of studies focusing on LSA and SF-36 subscores at the same time. Meanwhile, the results of studies evaluating similar features with SF-36 sub-parameters, health status, presence of depression, and cognitive status were stating the relation, as similar to LSA scores (8, 10, 16). In our study, all the LSA subscores, except for LSA-E established a positive correlation with SF-36 subscores. When we analyzed LSA-E, it was found that using equipment affects the general health status negatively, as expected and hypothesized. Similarly, negative correlations were observed with studies showing decreased health status in individuals using auxiliary equipment (36, 37). Further studies that group elderly people according to their decades of life, use of assistive devices, or fall frequencies, and have longer follow-up periods are needed to provide more information regarding the reduction in their life spaces during their aging processes.

Our study had several limitations. First, the participants consisted of elderly people who were living alone or with their families, or in different settings and situations such as in nursing homes or in urban or rural areas. These variations might have affected the homogeneity of our participants. Further studies may compare elderly people based on these variations. Second, the cognitive and communication levels of our participants were remarkably high. Meaningfully, elderly people with neurological problems, cognitive impairment, or communication problems could be included in future studies. Third, our study did not perform responsiveness analysis, which assesses the ability of a diagnostic test to measure change over time or the main effect of treatment approaches.

In conclusion, the study indicated that the Turkish version of LSA is a valid, reliable, and sensitive measurement tool for the assessment of the living space levels of the elderly in the Turkish population. In addition, LSA established significant correlations with other health assessment tools in terms of general health status and physical activity level. During aging processes, life space should be taken into consideration to determine individuals' self-affection on physical activity and health status level. The most complex measure, LS-C, which includes the use of equipment or personal assistance, as well as the frequency of reaching each living space, can be most useful when assessing the change in mobility in longitudinal studies. LS-I and LS-C are simpler measures that can be used to investigate the relationship between mobility and other factors in cross-sectional studies. LS-M or LS-E may be applicable to studies on the utility of having assistive devices or personal assistance in maintaining independent living.

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Ethical approval: All patients gave informed written consent to be enrolled in the study according to the Declaration of Helsinki. The study was approved by the local ethical committee, the Non-Interventional Ethics Committee of Fırat University (28.01.2019, 308442). In addition, the study was prospectively recorded in ClinicalTrials.gov (NCT03839927)

Informed consent: Informed consent was obtained for each participant prior to their involvement in the study.

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