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The Adaptation of the Successful Aging Inventory: Turkish Validity and Reliability Study

Başarılı Yaşlanma Envanterinin Uyarlanması: Türkçe Geçerlik Güvenirlik Çalışması

[1]Serpil Abalı Çetin, [2]Gül Ergün, [3]Işıl Işık

[1]Women's Health and Diseases Nursing, University of Bakırçay, Health Sciences Faculty, Department of Nursing, İzmir, Türkiye
[2]Psychiatric Nursing, University of Burdur Mehmet Akif Ersoy, Health Sciences Faculty, Department of Nursing, Burdur, Türkiye
[3]Psychiatric Nursing, University of Yeditepe Health Sciences Faculty, Department of Nursing, İstanbul, Türkiye

Özet: Bu çalışma, Başarılı Yaşlanma Envanteri'nin (BYE) Türkçe versiyonunun geçerlik ve güvenirliğini belirlemek amacıyla metodolojik tipte yapılmıştır. Veriler Burdur'da bir huzurevinde ve yedi farklı ilçedeki mahallerden yüz yüze görüşme yöntemiyle toplanmıştır. Araştırmanın örneklemini 60 yaş üstü 115 yaşlı birey oluşturmuştur. Uyarlama adımları uluslararası kabul görmüş bilimsel yöntemlere göre yapılmıştır. Ölçeğin yapı geçerliği doğrulayıcı faktör analizi ile yapılmış ve maddelerin faktör yükleri .41 ile .89 arasında bulunmuştur. Her bir madde puanı ile ölçek puanı arasındaki korelasyon katsayısının r=.21-.65; her bir alt ölçek maddesi ile alt ölçek puanının korelasyon katsayısı r=.57-.90; alt ölçek puanı ile ölçek puanının korelasyon katsayısının ise r=.33-.81 olduğu saptanmıitır. Bu sonuçlar arasında istatistiksel olarak anlamlı bir ilişki belirlenmiştir (p<.001). Cronbach alfa korelasyon katsayısı ölçeğin tamamı için .81, alt ölçekler için .62-.86 olarak bulunmuştur. Test-tekrar test güvenirlik analizinde ölçeğin iki ayrı uygulaması arasında anlamlı bir fark bulunmamıştır (p>.05). Bu çalışma, BYE'nin psikometrik versiyonunun geçerli ve güvenilir olduğunu ve yaşlı bakımı araştırma ve uygulamalarında kullanılabileceğini belirlemiştir.
Anahtar Kelimeler: Başarılı yaşlanma; Geçerlik; Güvenirlik

Abstract: This study was conducted to adapt the Successful Aging Inventory (SAI) into Turkish and to determine its validity/reliability. The study is a methodological type study. The data were collected by face-to-face interview method in a nursing home and different seven district in Burdur province. The sample of the study consisted of 115 elderly individuals over the age of 60. Adaptation steps were made according to internationally accepted scientific methods. Accordingly, the factor loads of the items were between .41 and .89, the correlation coefficient between the score for each item and the scale score was r=.21-.65; correlation coefficient of each subscale item and subscale score is r=.57-.90 (p<.001). The Cronbach's alpha coefficient is .81 for the whole scale and .62-.86 for the subscales. There was no significant difference in the test-retest analysis performed to determine the difference between the two separate applications of the scale (p>.05). In this study, it was concluded that the Turkish version of SAI is a valid and reliable tool and can be used in practice and research.
Keywords: Successful aging; Validation; Reliability.

ORCID ID of the authors: SAÇ. 0000-0003-0922-7060, GE.0000-0002-1292-2040, II. 0000-0001-9315-1139

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Correspondence: Serpil ABALI ÇETİN- Women's Health and Diseases Nursing, University of Bakırçay, Health Sciences Faculty, Department of Nursing, İzmir, Türkiye e-mail: serpil.cetin@bakircay.edu.tr

1. Introduction

Aging is a physiologically inevitable phenomenon. Old age, on the other hand, is a period of life that begins with the birth of a person, in which the person passes from independence to dependence, both physically and mentally, and where more than one pathology and their signs and symptoms often coexist (1). Changes in the organism with advancing age significantly affect the quality of life of the elderly individual. Many events in the whole life process, before old age and in old age; there are positive and negative effects on the behavior of the elderly (2). The most important concept that has developed with the twentieth century is the aging of societies. Developments in the triangle of medicine, science and technology and the decrease in birth rates constitute the cornerstones of this process. In addition, the increase in life expectancy at all ages as a result of developments in the field of health results in an increase in the number of people included in the elderly population every year.

One of the most important and prominent demographic phenomena in the twenty-first century is that societies are increasingly made up of more elderly people because the population of the world is aging rapidly and consistently. According to data from the World Bank, 8.9% of the world's population were aged 65 or more in 2017, while this ratio is expected to increase to over 16% in 2050. Individuals aged 65 and over are estimated to be 146 million in developed countries; It is predicted that this number will reach 232 million in 2020 and 1.4 billion in 2030. The continent with the highest percentage of the elderly is Europe (20%), while the continent with the lowest percentage of elderly population in the world is Africa (5%) (3). By 2050, the proportion of the elderly in Europe is expected to increase to 37%, while in Africa it is estimated that it will be 10% (4,5). The 21st century will be the century of elderly individuals our country, in parallel with the rest of the world. The ratio of the elderly in the total population is an indicator of a country's level of development and the number of elderly individuals in Türkiye was 6,895385 in 2017. The percentage of the elderly population in the total population increased from 5.9% in 2005 to 8% in 2014, and to 8.5% in 2017 (6). With these changes in age distribution, especially in the second half of the century, the elderly population is expected to gain in economic, social and demographic importance in Türkiye, which is expected to have an elderly population of around 16 million in 2050 (4).

Increasing life expectancy has raised the questions of how to increase the quality of health in later years and now to extend life. Developed countries in particular have taken steps in this regard and have developed policies to ensure healthy aging. Healthy aging is defined as improving health, physical, social, and spiritual well-being, preserving the ability to live independently, and maintaining and improving the quality of life. It is also defined as the lifelong optimization of opportunities for successful transitions between different stages of life. In addition, it has been emphasized that being able to live longer does not have any meaning without increasing the quality of life. The main objective of medicine with regard to the geriatric population is to maintain and improve the quality of life, while the goal of medicine for the young population is primarily treatment. Recently, the idea of "successful aging" has been focused on, referring to the quality of an individual's life. "Successful aging" includes a healthy and adaptive aging process, reducing the risk of illness and disability, ensuring a high level of mental and physical functioning, obtaining greater satisfaction with life, and having a high quality of life (7-9).

It is very important that the "successful aging" approach, which is one of the most important

topics in elderly health, be used in all societies. This approach, when adapted to the conditions of society, will demonstrate that the health of the elderly is taken seriously in modern Earth. In addition, it will aid the study of senility in many disciplines. In recent years, it has been emphasized that senility is a process that needs to be evaluated in terms of its physical, psychological and social dimensions, and that the symptoms observed in old age may be different in each individual. In addition, the social aspects of senility need to be evaluated according to the structure of a society and how senility is positioned and understood within this structure. From a psychosocial point of view, it is necessary to develop strategies to keep the relatives of elderly individuals in touch with their family and immediate environment alive in order to go through a successful aging process (10-13). Therefore, there is a need for valid and reliable data collection tools to determine the conditions for successful aging among elderly individuals in our own society. Because successful aging is significantly influenced by socio-cultural events, it requires psychometric validation and measurements to determine the applicability of the developed scales in the adapted culture. Therefore, this study was conducted to adapt the Successful Aging Inventory (SAI) into Turkish and to determine its validity/reliability

2. Materials and Methods

Type of Study

This study is a methodological type study.

Place and Time of the Study

The data were collected between the dates of 15.05.2018-15.10.2018 in Berberoğlu Nursing Home in the province of Burdur and in Bahçelievler, Karasenir, Mehmet Akif Ersoy District, Yeni Mahalle, Yenice District, Konak District and Burç District.

Pre-study/Language and Content Validity

The translation of the scale was carried out by following the steps given below:

1- The scale was first translated from English to Turkish by three independent speakers with native proficiency in both languages. These translations were combined with work by two academics with advanced level of English.

3- The combined translation was translated back from Turkish to English by an expert translator in both English and Turkish languages, and the reversed scale was compared with the original scale. The scale was examined in terms of the appropriateness of the translation and the scope of the scale by six experts who teach Community Health, Adult Health and Elderly Health and are experts in scale development. All suggestions were evaluated and the scale was given its final shape.

5- The scale, which was finalized after receiving expert opinion, was pre-applied to a group of 30 people with similar characteristics to the elderly individuals to be included in the study. Since each item was found to be understandable in the preliminary application, no changes were made in the scale (14,15).

Sample of the Study

It is recommended that the sample size should be 5-10 times the number of items in order to perform factor analysis in scale validity and reliability studies (16). It has been reported that there should be at least 30 pairs of data for conducting the test-retest evaluation (17). This study aimed to reach at least 115 elderly individuals based on the number of items of the scale. In addition, a second application was performed after 15 days for the test-retest application. The data of 62 individuals who filled out the scale fully were analyzed (17-19).

The mean age of the 115 individuals in the sample was 72.61 ± 7.00. 45.2% (n=52) of them were women; 54.8% (n=63) of them were men. The mean active period of employment was 27.11 ± 8.71 years. 63.5% (n=73) of the individuals were primary school graduates. More than half of the elderly individuals (52.2%) were married and 69.6% of them lived in the city center (Table 1).

Data Collection Form

The data collection form consists of two parts. The first part consists of five questions about individual characteristics while the second part contains the SAI. The SAI is a 20-item scale developed by Troutman et al. The 11 items (4) of this 5-point Likert type scale are answered as (4) "always", (3) "often", (2) "approximately half of the time", (1) "sometimes" or (0) "almost never". The other nine items of the scale are answered as (0) "strongly disagree", (1) "partially disagree", (2) "neutral", (3) "partially agree" and (4) "strongly agree". The scale consists of five sub-dimensions; the scores range between 0-80 and there is no cut-off point. Higher scores on the scale are interpreted as indicating more successful aging.

Data Analysis

The SPSS 20.0 program was used to analyze the validity and reliability of the scale. The content validity of the scale was evaluated using the Content Validity Index (CVI) (20,21). Confirmatory factor analysis was performed for construct validity in LISREL program (17,18,22,23). SAI's reliability is internal consistency,

item analysis was analyzed with corrected item-total correlation (17,18). Cronbach's alpha coefficient was used in the internal consistency analysis. The time invariance of the scale and its sub-dimensions was evaluated with the t-test for dependent groups (paired sample t-test) and the Pearson product-moment correlation coefficient (17-19).

3. Results

In this study, which tested the psychometric properties of the SAI, the findings are given in two parts: the validity findings are given in the first section below, while the reliability findings are given in the second section below.

Table 1. Descriptive Characteristics of Elderly People (n: 115)

Characteristics	n	%
Gender		
Woman	52	45.2
Male	63	54.8
Educational status		
Not graduated/no education	22	19.1
Primary education	73	63.5
High school and university	20	17.4
Marital status		
Married	60	52.2
Single	26	22.6
Others	29	25.2
Working status		
Yes	5	4.3
No	36	31.3
Retired	74	64.3
Economical situation		
Good	44	38.3
Middle	63	54.8
Bad	8	7.0
Where most of life is spent		

City	80	69.6
District	20	17.4
Village	15	13.0
People living with		
Alone	29	25.2
With his wife	52	45.2
With someone from the family (daughter, son, bride, groom, relative)	10	8.7
Nursing home	24	20.9
Physical conditions of the house		
Good	80	69.6
Middle	33	28.7
Bad	2	1.7
	Minimum_Maximum	**$\bar{X}$ ±SD**
The average age	63-92	72.61±7.00
Active working time (years) (n: 74)	4-60	27.11±8.71

Validity Findings

Content Validity

For the content validity of the scale items, the opinions of 6 expert faculty members were calculated as CVI; the CVI value of the items ranged between 0.50 and 1.00, and 0.86 for all scale items.

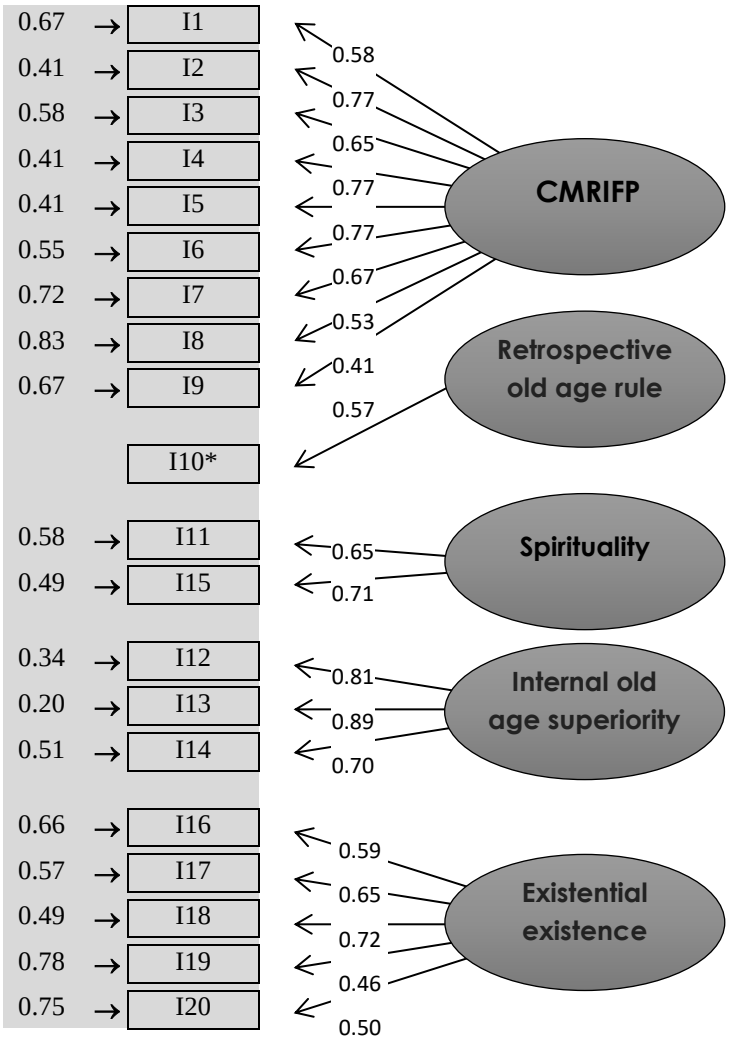
Structural Validity (Factor Analysis)

Confirmatory factor analysis (CFA) was performed to determine the construct validity of the Turkish version of the Successful Aging Inventory, and the compliance values are given in Table 2.

Table 2. Confirmatory Factor Analysis Compliance Values of the Successful Aging Inventory (n: 115)

CFA Compliance Statistics	CFA Compliance Values
Chi-square / p value	215.72/ 0.00013 (p < .05)
Degree of freedom	145
Chi-square value: degree of freedom	215.72/ 145 = 1.49
RMSEA / p	0.065 (p < .05)
SRMR	0.077
CFI	0.93
NNFI	0.92
GFI	0.83
AGFI	0.78

The path coefficients (factor loads) of the scale items with their own dimensions were .41 and .77 for the sub-dimension of coping mechanisms related to intrapsychic and functional performance, .65 and .71 for the sub-dimension of spirituality, .70 and .89 for the sub-dimension of internal old age superiority, and .46 and .72 for the sub-dimension of existential existence (Figure 1).



Chi-Square= 215.72, df= 145, p-value=0.00013, RMSEA= 0.065
* Since there was only one item in the sub-dimension, it was not included in the Confirmatory Factor Analysis.

Figure. 1. Confirmatory Factor Analysis of the Successful Aging Inventory: Error Variances and Path Coefficients

Reliability Findings

To determine the reliability of SAI, item-total score correlations of 20 items were analyzed. The reliability coefficient was between r: .21 and .65, and it was seen that there was a positive and statistically significant relationship between them (p<.01 for m10; p<.05 for m12, 13, and 14; p<.001 for other items). When the item-sub-dimension score correlations of the items of the SAI were examined, it was found that the reliability coefficient of each item with its own sub-dimension was between r: .57 and .90 and was positively and statistically significant (p<.001, Table 3).

Table 3. Successful Aging Inventory Item-Total and Item-Sub Dimension Score Correlations (n: 115)

Sub-Dimension	Items of the Successful Aging Inventory	Item-Total		Item-Sub-dimension	
		r	p	r	p
Coping mechanisms related to intrapsychic and functional performance	1. I can meet my needs such as eating, bathing and dressing and the needs of my home.	.55	**<0.001**	.63	**<0.001**
	2. I can cope with the changes in my body with aging.	.59	**<0.001**	.76	**<0.001**
	3. I look at the future with hope.	.48	**<0.001**	.67	**<0.001**
	4.I feel I can cope with my aging.	.65	**<0.001**	.75	**<0.001**
	5. I am able to cope with life events.	.64	**<0.001**	.76	**<0.001**
	6.I can produce solutions to problems.	.64	**<0.001**	.78	**<0.001**
	7.I am successful in producing new solutions to problems.	.57	**<0.001**	.68	**<0.001**
	8. I love doing creative work or producing something new.	.35	**<0.001**	.57	**<0.001**
	9. I am in an optimistic and positive mood.	.59	**<0.001**	.65	**<0.001**
ROAS*	10. I think about my deceased relatives and feel close to them.	.21	**.023**	-	-
Spirituality	11. I spend time praying and on other religious activities.	.37	**<0.001**	.89	**<0.001**
	15. The relationship with God or the power I believe is important to me.	.40	**<0.001**	.81	**<0.001**
Internal old age superiority	12. As I get older, my philosophy of life has changed.	.28	**.002**	.88	**<0.001**
	13. I would rather have a few close friends than have many friends.	.32	**.001**	.90	**<0.001**
	14. Sometimes a problem or situation can have two correct answers.	.27	**.003**	.83	**<0.001**
Existential existence	16. I am interested in the next generation and I am concerned for them.	.53	**<0.001**	.68	**<0.001**
	17. I find my life meaningful.	.49	**<0.001**	.72	**<0.001**
	18. I am generally satisfied with my life now.	.54	**<0.001**	.76	**<0.001**
	19. I think I serve a purpose in this world.	.43	**<0.001**	.62	**<0.001**
	20. Being this age is as good as I thought or even better than I thought.	.52	**<0.001**	.64	**<0.001**

** Retrospective old age superiority*

The relationship between the scores for the four sub-dimensions of the Turkish version of the SAI and the scores for the whole scale was evaluated by Pearson correlation analysis. When the correlations between the scores for the whole SAI and its sub-dimensions were examined, the reliability coefficients were 0.81, 0.44, 0.33 and 0.74 for the sub-

dimensions of coping mechanisms related to intrapsychic and functional performance, spirituality, internal old age superiority, and existential existence, respectively. They were found to be positive, very strong and statistically very significant (p <.001).

In the analysis performed for the internal consistency analysis, the Cronbach alpha reliability coefficient for the whole scale was found to be 0.81. The Cronbach's alpha reliability coefficients of the sub-scales were found to be 0.86, 0.62, 0.84 and 0.72 for the sub-dimensions of coping mechanisms related to intrapsychic and functional performance, spirituality, internal old age superiority, and existential existence, respectively (Table 4).

Table 4. Reliability coefficients of the Successful Aging Inventory and its sub-dimensions (n: 115)

Scale and Sub-dimensions		**α**
Successful Aging Inventory		.81
Sub-dimensions	1. Coping mechanisms for intrapsychic and functional performance	.86
	2. Retrospective old age superiority *	-
	3. Spirituality	.62
	4. Internal old age superiority	.84
	5. Existential existence	.72

** Since there is only one item in the sub-dimension, its Cronbach's alpha coefficient cannot be calculated.*

Test-Retest

It was found that there was no significant difference between the mean scores for the five sub-dimensions and the whole SAI obtained from the two repeated measurements of the elderly individuals (p>.05, Table 5).

Table 5. Comparison of Test-Retest Mean Scores for the Successful Aging Inventory and Its Sub-dimensions and ICC Values (n: 77)

Scale and Sub-dimensions	**Pre-test**	**Post-test**				
	$\bar{X}$ ±SD	**$\bar{X}$ ±SD**	**t**	**p**	**ICC**	**p**
Successful Aging Inventory (Total)	76.06±8.86	75.56±8.35	1.204	.232	.95	<0.001
Sub-dimensions						
1.Coping mechanisms for intrapsychic and functional performance	33.79±5.99	33.57±5.95	.917	.362	.97	<0.001
2. Retrospective old age superiority	2.62±1.27	2.55±1.18	.883	.380	.89	<0.001
3. Spirituality	7.51±1.98	7.34±2.06	1.437	.155	.93	<0.001
4. Internal old age superiority	12.95±2.33	12.87±2.38	.652	.516	.95	<0.001
5.Existential existence	19.19±3.80	19.23±3.97	.154	.878	.91	<0.001

t: t-test for dependent groups, sd: 76 ICC: Intraclass correlation coefficient

When the ICC was examined to test the consistency between the test and retest scores for the whole scale and the five sub-dimensions, the ICCs were found to be .95 for

the whole scale and ranged between .89- .97 for the five sub-dimensions; the consistency coefficient was very significant (p<. 001, Table 4).

4. Discussion

This study assessed the validity and reliability of the SAI in the elderly individuals in Türkiye; it was found that the Turkish version of the scale met the validity and reliability criteria at an acceptable level.

In scale adaptation studies, it is recommended to compare the factor structure of the adapted scale with the factor structure of the original scale and evaluate the similarities or differences (18,19). CFA is a method in which model-data fit coefficients are calculated, and the fit indices (Chi-square-fit, RMSEA, SRMR, CFI, NNFI, GFI, and AGFI) are evaluated (22,23).

In this study, CFA was performed to examine the structural validity, whether the items were adequately represented in the identified sub-dimensions and whether the sub-structures were sufficient to explain the original structure of the scale. It is recommended that the path coefficients (factor loads) showing the relationship of the items in the scale to the sub-dimension be at least .30 or more (21-23). In the Turkish version of the SAI, the path coefficients (loads) of all items were found to be sufficient and ranged between .41 and .89.

Goodness of fit statistics should be at the desired level in the CFA. Although the chi-square value is expected to be significant for an acceptable model, in practice it is very sensitive to sample size. Therefore, it can be found meaningful. The chi-square value is alternatively divided by the degrees of freedom. If the obtained value is 2 or/and less, the model is a good model (22,24). Accordingly, this value is 1.49 for the Turkish version of SAI. Therefore, it can be said that the scale is a good model structurally. Other commonly used goodness-of-fit tests are Root Mean Square Error of Approximation (RMSEA), Standardized Root-mean-Square Residual (SRMR), Comparative Fit Index (CFI), Non-Normed Fit Index (NNFI) (22,24). An RMSEA equal to or less than 0.08 and a p value less than .05 (statistically significant) indicate a good fit (22,24), while an RMSEA equal to or less than 0.10 indicates a poor fit (24). In this study, the RMSEA value of the Turkish version of the Successful Aging Scale was found to be significant and .065 (p<.001), indicating a good fit for the factor structure. SRMR less than .10 (24), CFI and NNFI values equal to or above 0.90 indicate good fit. .90 and above is an acceptable fit, 95 and above is an indicator of good/excellent fit (22,24). According to the SRMR (.077), CFI (.93), NNFI (.92) values obtained in this study, it was seen that there was a good fit in the Turkish adapted form of the SAI.

Although there are different values in the literature regarding the lower limit of the item-total score correlation coefficient, .20 is generally accepted as the lowest level. If the reliability coefficient is between .30 and .40, the items are considered discriminatory at a good level, and the items are considered very good if it is 0.40 and above (17,18). In the literature, it has been stated that reliability calculations should be made for each sub-dimension in scales with sub-dimensions (18). In our study, the lowest sub-dimension item-total score correlation coefficient was .33 while the highest was .81; the sub-dimensions of this scale were correlated with the whole scale.

The Cronbach's alpha reliability coefficient is another method recommended for evaluating internal consistency in Likert-type scales. When the value of the Cronbach's alpha coefficient increase (near 1), the items in a scale consist of items that are consistent with each other and predict the same feature (17-

19). A value between .40 and .59 indicates low reliability; a value between .60 and .79 indicates high reliability; a value is between .80-1.00 indicates very high reliability (25,26). In our study, the Cronbach's alpha coefficient of the whole scale was .81, thus the scale is highly reliable, and the Cronbach's alpha coefficients were between the limits for high reliability in all sub-dimensions (lowest value= .62, highest value= .86). In the study conducted by Troutman (2011), the Cronbach's alpha coefficient was found to be .86 (13).

Test-retest analysis is performed to evaluate the invariance of the test against time (17-19). For the test-retest analysis, it is recommended that there should be at least two weeks and at most four weeks between the first and second measurements (18,19,27). The test should be performed with at least 30 individuals (17). A higher increase in correlation coefficients between test-retest scores indicates a similar increase in consistency between the first and second measurements. The correlation coefficient is required to be .60 and above for the r value and to be at least 0.70 for ICC. The consistency between the results of repeated applications of the scale is an indicator of its invariance through time (17-19). ICC values between .70 and .84, between .85 and .94, and between .95 and 1.00 show medium, high, and perfect compliance, respectively (26). In the test-retest analysis performed after 30 days and 15 days, it was found that the reliability of this scale was high; there was an 89-97% compliance between the repeated measures. The total score for compliance was excellent in the first and fourth sub-dimensions and high in the second, third and fifth sub-dimensions.

5. Conclusion

In this study, the psychometric adaptation of SAI for use in elderly individuals in the Turkish population was evaluated. Adaptation steps were made in accordance with internationally accepted scientific methods. And it was determined that the Turkish version of the scale met the validity and reliability criteria. In addition, it was found to be compatible with the factor structure of the scale adapted with the original scale, and the reliability values of the Turkish version were similar to the original scale. As a result, it was been finalized that the scale can be used in elderly care studies and practices.

Limitations

It may be considered a limitation that the study was performed in only one city of Türkiye. However, this limitation was eliminated as the elderly individuals from all social strata in the province were included in the study.

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Ethics

Ethics Committee Approval: In order to carry out the validity and reliability study of the Turkish Successful Aging Inventory, permission was obtained from Meredith Troutman, who developed the scale, and the approval was obtained from the Non-Interventional Clinical Research Ethics Committee of Mehmet Akif Ersoy University (GO 2018/42). Permission was also obtained from the Berberoğlu Nursing Home Directorate (69871852-621.01-E.20923, Nursing Home Document Number: 20003936/125-201802730). In addition, verbal and written informed consent was obtained from the elderly individuals before sampling.

Informed Consent: The authors declared that it was not considered necessary to get consent from the patients because the study was a retrospective data analysis.

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