RESEARCH

VALIDITY AND RELIABILITY STUDY OF THE TURKISH VERSION OF PHYSICAL ACTIVITY SCALE FOR THE ELDERLY IN NURSING HOMES

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Abstract

Introduction: Physical activity is a reliable factor in healthy aging. Various scales have been used to evaluate physical activity in the elderly. The aim of this study was to test the validity and reliability of the Physical Activity Scale for the Elderly on residents of nursing homes.

Materials and Method: This cross-sectional study was conducted on 93 elderly individuals of both genders who were in nursing homes. A retest of the scale was conducted 3–7 days later. The intraclass correlation coefficient and Spearman correlation coefficient were used to determine test-retest reliability. Cronbach's alpha coefficient was used to determine internal consistency, and the Spearman correlation coefficient for concurrent validity between scales.

Results: The intraclass correlation coefficient (0.624) and Spearman correlation coefficient (0.701) was moderate. Statistically significant correlations were found between Physical Activity Scale for the Elderly and Nottingham Health Profile, International Physical Activity Questionnaire, Grip Strength, and Timed Up and Go Tests (Spearman correlation coefficient = 0.297, 0.402, 0.295, and 0.462, respectively; $p < .05$). The Cronbach's alpha coefficient of the internal consistency calculation, demonstrating the reliability of the scale, was found to be 0.469.

Conclusion: The results of this study demonstrated that Physical Activity Scale for the Elderly is a valid tool for evaluating the physical activity level of elderly people living in a nursing home. The reliability outcomes highlight that healthcare workers should be very careful when using this questionnaire in a nursing home and that the physical conditions of the residential home should be taken into account.

Keywords: Geriatrics: Exercise; Surveys and Questionnaires; Nursing Homes.

INTRODUCTION

Physical activity is a modifiable behavioral risk factor linked to elderly people's quality of life and health. It is a good habit that can help with chronic disease rehabilitation, treatment, and prevention. Physical activity has long been recognized as a means of reducing these negative health effects. As a result, numerous scientific bodies advise doing a certain amount of physical activity each week. As people age, the degree of physical activity they engage in diminishes. Low levels of physical activity is a major public health concern because it increases the risk of chronic diseases, disability, and physical frailty (1, 2).

Environmental variables have a significant role in aging. The home is a place where a person feels protected and where he or she has memories. When elderly people live alone in their own homes, they have housekeeping obligations. Because of health issues, fear of falling, a desire to remain social, or the convenience, some elderly people opt to live in nursing homes. The nursing home has emerged as a new environment that gives older people greater control over their health, as well as a reduction in domestic obligations and more social opportunities(3). It is critical for older people to engage in an acceptable level of physical activity in order to complete daily activities independently without assistance. As a result, it is critical to measure physical activity while taking into account the living environment of elderly (4).

Recent research on the future health of the elderly population and improvements in quality of life has received a great deal of attention, and the relevance of physical exercise has been highlighted in these studies (5, 6). To be able to understand their needs, it is important to assess the level of physical activity in the elderly (7–9). Questionnaires, diaries, accelerometers, and pedometers are some of the tools that can be used to assess physical activity in the elderly. For the measuring of physical activity in the elderly, questionnaires tend to be popular. They are often practical in large epidemiological investigations and well accepted by participants, unlike accelerometers. Questionnaires can provide useful information regarding various domains (e.g., home, leisure time) and types of activities (e.g., walking, weight training)(10).

Various scales have been developed for the assessment of physical activity levels and are used by healthcare professionals as they are easy to apply, inexpensive, and readily available (2). However, as the physical activity level of elderly individuals typically includes low-intensity activities and activities of daily living rather than moderate and high-intensity activities, it is very difficult to test physical activity with general scales. In addition, completing the physical activity questionnaire may be difficult for the elderly, if activities are undertaken at random and not at regular intervals, thereby causing recall problems (7). Therefore, it is important for these methods to be suitable for the elderly and to be standardized. There are scales that have been developed specifically for the elderly to deal with such problems and achieve more reliable results, and these scales are similar in content to each other (8–10). The Physical Activity Scale for the Elderly (PASE) was developed in 1993 by Washburn et al. (11), and the validity and reliability study of the Turkish version of PASE was conducted by Ayvat et al. (12).

Differences in social, physical, and environmental conditions should also be taken into account when evaluating the physical activity level of the elderly. As has been previously stated, residents in nursing homes are subject to different environmental conditions and are more sedentary than their peers living in the community (13). In addition, the use of physical activity scales in the elderly living in nursing homes should be applied in a distinct manner, since frailty and health problems are more common in the elderly living in nursing homes and they do not have responsibilities such as household

chores (3). Therefore, the aim of this study was to test the validity and reliability of the Turkish PASE on residents of nursing homes.

MATERIALS AND METHODS

Participants

Approval for the study was granted by the Non-Interventional Ethics Committee of Hacettepe University. The participants were residents in five different nursing homes in Ankara. Individuals were excluded if they had a disability that prevented physical activity, were only wheelchair mobile or were bedridden, had a disease diagnosis that affected their mental state, such as Alzheimer's, or scored < 24 points in the mini mental-status test. The demographic data, medications, assistive devices, and educational status of 93 elderly individuals who fulfilled the inclusion criteria and provided informed consent were recorded.

Procedure

With the permission of Washburn and Ayvat, the validity and reliability of the questionnaire were investigated in elderly people who were living in nursing homes. The questionnaire can easily be scored and completed in about 5 minutes. It is a self-reported 10-item questionnaire, with sub-sections related to leisure activities and household tasks. In cases of reading difficulties or illiteracy, the form was completed by the researcher. In order to evaluate the intra-rater reliability of the Turkish version of PASE, the questionnaire was re-administered to 38 of the 93 nursing home residents within 3–7 days (11, 12). To determine the validity of PASE, the Nottingham Health Profile (NHP) and the International Physical Activity Questionnaire (IPAQ) were also applied to all 93 nursing home residents. In addition, physical function and performance were evaluated using a Timed Up and Go Test (TUG), Five Times Sit to Stand Test (FTSST) and grip strength test (GST) for the results to be used in the validity analyses.

Instruments

The NHP consists of sub-sections on energy level, pain, physical activity, sleep, emotional reaction and social isolation. The questions are related to current complaints and are answered as *yes/no*. The total score may range between 0 and 600, with a higher score indicating adverse effects (14).

The Turkish version of the IPAQ was used. The items related to intense physical activity duration, walking, and sitting time over the previous 7 days. The total physical activity score was calculated by converting the intense and moderate physical activity and walking times to MET, which corresponds to the basal metabolic rate (15). Daily sitting time in hours was also recorded.

The TUG test is frequently used with elderly individuals to evaluate mobility skills. In the test, the person is seated on a chair with back support but without arm support and is instructed to stand, walk 3 meters, return, and sit down on the same chair (16).

The FTSST is frequently used with the elderly to evaluate postural control, risk of falling, lower extremity muscle strength, and proprioception. In this test, the subject is seated in a chair with normal back support and is instructed to stand and then sit again 5 times (17).

A standard JAMAR-brand hand dynamometer was used to assess GST, as this is a valid and reliable test allowing for the evaluation of upper extremity functional skills and muscle strength. The subject is seated on a chair with back support, with the shoulders neutral, the elbow in 90˚ flexion, and the forearm in a neutral position. Three measurements were taken from the dominant side, and the average of the measurements was recorded in kilograms (kg) (18).

Statistical Analysis

The data were analyzed using IBM SPSS software, version 22.0. Continuous variables were presented as mean ± standard deviation and median

(25th–75th percentile). Values and categorical variables were presented as numbers and percentages.

In the test-retest reliability analysis, the intraclass correlation coefficient (ICC) and Spearman correlation coefficient were used. An ICC between 0.5 and 0.75 indicates moderate reliability and higher than 0.75 indicates good reliability (19). To determine internal consistency, Cronbach's alpha coefficient was used. A Cronbach's alpha value of > 0.70 indicates acceptable reliability (20). For concurrent validity, the Spearman correlation coefficient between PASE and NHP, IPAQ, TUG, FTSST, and GST was examined. A correlation coefficient of 0–0.25 indicates a "poor correlation", 0.26–0.50 a "moderate correlation", 0.51–0.75 a "good correlation," and 0.76–1.00 a "very good correlation" (21).

RESULTS

Characteristics of the Participants and Descriptive Statistics

The 93 elderly individuals living in nursing homes who participated in the study comprised 64 males and 29 females. The demographic characteristics, educational level, and chronic illness status of the cases are shown in Table 1. The descriptive statistical results of outcome measures are summarized in Table 2.

Validity

Significant correlations were found between PASE score, PASE leisure-time activity subheading score, and NHP, IPAQ, sitting time, TUG, FTSST and grip strength. A significant correlation was found between the PASE housework activity subheading score and TUG. Results of validity analysis are summarized in Table 3.

Reliability

Test-retest correlations to test the reliability of PASE are shown in Table 4. Work-related activity was not evaluated because none of the participants worked. The Cronbach's alpha value of the internal consistency calculation, used to test the reliability of the scale, was calculated as 0.469.

DISCUSSION

The results of the study demonstrated that the total score and leisure activity section of PASE are valid tests for the assessment of physical activity in the elderly in nursing homes, but that the work-related activities section cannot be used for nursing home residents. The results of the current study are similar to the results of studies by Ismail et al., which measured the validity and reliability of PASE for the elderly living in nursing homes (22).

In previous studies, the total PASE score has been found to be lower in the elderly living in nursing homes than in the elderly living in the community (7, 23). In the current study, the total PASE scores were found to be quite low. Although it is thought that this result may be related to the lack of a suitable environment and environmental conditions for physical activity in some of the nursing homes, it was determined that PASE did not have a suitable structure for implementation in nursing homes in terms of home- and work-related activities. Therefore, it was concluded that when evaluating the physical activities of the elderly in a nursing home with PASE, it is important to take into account the sub-section of leisure activities, not the total score. In the Chinese version of the PASE study by Vaughan and Miller, elderly individuals were separated into two groups: those living in nursing homes and those living in the community. It was emphasized that the group living in nursing homes was more inactive than those living in the community (23). Similarly, total PASE scores were low in the current study. Physical activity was associated with functional mobility in nursing home residents (13). In the current study, there was a significant positive relationship between PASE total score and TUG.

In the validity analysis of PASE, relationships with other equivalent scales and performance tests were

Table 1. The demographic characteristics of the participants (N=93).

		Mean ±SD	Min-Max
Age (years)		74.68.7	65-105
Height (cm)		162.810.7	110-190
Weight (kg)		72.517.3	40-140
Body mass index (kg/m^2)		27.57.0	14.9-56.1
		N	%
Education Level	Illiterate	13	14
	Primary and Secondary Education	72	57.6
	High School Education	12	12.9
	University Education	6	6.5
Chronic Diseases	Diabetes	20	21.5
	Hypertension	41	44.1
	Cholesterol	2	2.2
	Heart Diseases	25	26.9
	Rheumatic Diseases	7	7.5
	Chronic Obstructive Pulmonary Disease	7	7.5

taken into consideration. The PASE total score and leisure-time activities score were calculated to have a moderate and clinically significant relationship with NHP, IPAQ, and TUG scores. These results are similar with the findings of Alqarni (24). The relationship between PASE and IPAQ reveals the validity of PASE in evaluating physical activity in the elderly. In a study by White et al., the relationship between physical activity and quality of life in the elderly was examined by evaluating physical activity with PASE, and it was reported to be associated with quality of life (25). In the current study, PASE correlated with NHP consistent with the findings of White et al.

Table 2. The results of PASE, NHP, IPAQ, Sitting Time, TUG, Five Times Sit to Stand Test and Grip Strength

	Mean±SD	Median (25-75 Percentiles)
PASE Total	24.7±35.9	9.03 (0 – 33.82)
Leisure Time Activity	12.4±18.7	8.6 (0 – 14.03)
Housework Activity	12.4±26.6	0 (0 – 25)
Work Related Activity	0±0	
NHP	256.9±155.1	272.2 (123.3 – 377.0)
IPAQ	640.0±945.0	297 (0 – 693)
Sitting Time (hours)	8.2±3.6	8 (6 – 10)
TUG (secs)	15.7±7.2	13.5 (10.6 – 18.2)
FTSST (secs)	16.7±6.0	14.9 (13.2 – 18.8)
Grip Strength (kg)	23.4±7.1	23 (18.4 – 29.2)

PASE: Physical Activity Scale for the Elderly, NHP: Nottingham Health Profile, IPAQ: International Physical Activity Questionnaire, TUG: Timed Up and Go Test, FTSST: Five Times Sit to Stand Test.

Table 3: The correlations between PASE and NHP, IPAQ, Sitting Time, TUG, Five Times Sit to stand Test and Grip Strength

	PASE Total		Leisure Time Activity		Housework Activity	
	r	p	r	p	r	p
NHP	-0.297	0.004*	-0.349	0.001*	-0.144	0.167
IPAQ	0.402	<0.001*	0.538	<0.001*	0.127	0.225
Sitting Time	-0.216	0.037*	-0.287	0.005*	-0.089	0.394
TUG	-0.462	<0.001*	-0.419	<0.001*	-0.272	0.010*
FTSST	-0.249	0.024*	-0.231	0.037*	-0.154	0.168
Grip Strength	0.295	0.005*	0.250	0.019*	0.174	0.104

PASE: Physical Activity Scale for the Elderly, NHP: Nottingham Health Profile, IPAQ: International Physical Activity Questionnaire, TUG: Timed Up and Go Test, FTSST: Five Times Sit to stand Test. *** p<0.05**

According to the results of a study by Harada et al., of three different self-reported physical activity scales used to assess the elderly, a correlation was found between PASE and the Short Physical Performance Battery and PASE and the 6-min walk test, and these correlations were stronger in the elderly living in nursing homes (7). In the current study, the correlation of PASE total score and leisure-time activities with performance-based tests (GST, FTSST, and TUG) is an indication that PASE can be used as a valid method for elderly residents in the evaluation of physical activity.

In the reliability analysis of PASE in this study, the Cronbach's alpha coefficient was lower (0.469) than in other studies (22, 24). PASE has a different scoring system than the well-known Likert-type scales. As the answers to some questions were a 0 on the scale among all nursing home participants, these questions were excluded from the statistical analysis. As the Cronbach's alpha coefficient is also sensitive to the number of items, the internal consistency of the scale seems to be low. However, individuals living in a nursing home do not do housework, their activity levels are low, and there are limited social relationships with people like neighbors, and these factors affect the results. Therefore, caution is advised in the use of this scale when studying the elderly living in nursing homes.

The ICC of the PASE total score was 0.62; our result is similar to the original PASE article and Japanese version of PASE (11, 12, 24).

This study is the first to examine the validity-reliability of PASE in elderly individuals living in nursing homes in Turkey, and it reveals important information about the measurement of the physical activity levels of the elderly living in nursing homes. How-

Table 4. Test-retest reliability and intraclass correlation coefficients of PASE and subheadings

	R	p	ICC	p
PASE Total	0.701	<0.001	0.624	<0.001
Leisure Time Activity	0.640	<0001	0.491	<0.001
Housework Activity	0.636	<0.001	0.517	<0.001

r: Spearman correlation coefficient, ICC: Intraclass correlation coefficient

ever, the fact that the study was conducted in only five nursing homes in one province is a limitation in terms of the generalizability of the study. In order to achieve more generalizable results, multicenter studies are required, including nursing homes located in different regions of our country.

CONCLUSION

The results of this study demonstrated that PASE can be used specifically for assessing leisure-time activities in evaluating the physical activity level of elderly individuals living in nursing homes. It was determined that the leisure-time activities subsection was determinative when PASE was used to evaluate the level of physical activity in the elderly in nursing homes and that it would be appropriate to use this subsection. However, the structure and functioning of nursing homes should be considered when assessing the physical activity of elderly individuals living in nursing homes in Turkey. It was concluded that there is a need for physical-activity evaluations to be developed that would include activities independent of work-related activities.

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Competing interest

The authors have no conflicts of interest to declare.

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