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Original Article

Translation and validation of the Physical Activity Scale for the Elderly in Filipino community-dwelling older adult fallers and non-fallers

Donald Lipardo[a,b], Eudinel Joshua Lopez[a], Sharmaine Santiago[a], Mariel Tubig[a], Gerard Joseph Enriquez[a], Carmela Grace Canares[a], Marc Pagaduan[a], Kristina Devora[a]

[a]Department of Physical Therapy, College of Rehabilitation Sciences, University of Santo Tomas, Manila, Philippines; [b]Center for Health Research and Movement Sciences, College of Rehabilitation Sciences, University of Santo Tomas, Manila, Philippines

Correspondence should be addressed to: Donald Lipardo[a,b]; dslipardo@ust.edu.ph

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Abstract

Background: Increased falls rate in older adults may be due to a declining level of physical activity. However, there is currently no local assessment tool to assess the physical activity of older adults in the Philippines. **Purpose**: The objectives of the study were to: (1) translate the Physical Activity Scale for the Elderly (PASE) in Filipino (PASE-F); (2) establish the validity and equivalency of PASE-F version; and (3) determine the association between physical activity level and fall history in older adults living in the community. **Methods**: Standard translation procedure was followed. Qualitative analysis and appropriate revisions were done based on the comments of three health professionals in geriatric care. Equivalency was analyzed using two-sample t-test with equal variances, and Spearman Rho. The association of physical activity with fall history was established using simple logistic regression. **Results**: 310 (62.3% females) community-dwelling older adults, with mean age 68 ±6.5, from Manila, Philippines participated. The validated PASE-F and the original PASE were equivalent with a p-value of 0.84, and Spearman's Rho of >0.05. No significant association was found between PASE-F scores and fall history, p-value = 0.16, 95% CI [1, 1.004]. Fallers show non-significantly higher PASE-F scores compared to non-fallers. **Conclusion**: PASE-F is a valid and equivalent translation of the original PASE. However, obtained PASE-F scores did not show association with a history of falls. Prospective studies may be done to determine the predictive value of PASE-F scores in the incidence of falls.

Keywords: physical activity, older adults, fall history

INTRODUCTION

Occurrence of falls among older persons is a common phenomenon with a global prevalence rate of 28-35% for those 65 years old or above.[1] A fall could have fatal or non-fatal physical consequences that could also result into psychosocial problems, and economic burden to the family and community.[2,3] The increased incidence of falls may be due to the associated decrease in physical activity with advancing age.[4-6] Physical activity (PA) refers to any body movement brought about by the action of skeletal muscles that result in increased expenditure of energy.[6] Decreased PA may lead to reduced strength, flexibility, agility and endurance of older persons which could eventually result in a fall.[4-6]

To assess PA in older adults, several direct and indirect measures have been developed.[7] Direct measures objectively assess PA using accelerometers, pedometers, or doubly labeled water method. The indirect measures subjectively assess PA using questionnaires such as the International Physical Activity Questionnaire (IPAQ), Community Healthy

Activities Model Program for Seniors (CHAMPS), Yale Physical Activity Scale (YPAS), and Physical Activity Scale for the Elderly (PASE).[8,9]

Direct PA measures are considered more accurate by providing data on energy expenditure and movement counts, compared to indirect PA measures which are prone to recall bias.[7] However, for community-based programs and large epidemiologic studies, indirect PA measures are more practical, cost-effective, and easier to administer.[7] The subjective measures can provide the specific types of activities the respondents are involved in, and not just numerical information.

Among the commonly used questionnaires, PASE is the most concise tool composed of 10 questions on the frequency, duration, and intensity of leisure, household, and work-related activities within the past seven days.[10] It can be completed in a relatively shorter period of time (5–15 minutes) and easily scored, which reduces the participant burden.[11] The higher the total score, which could range from 0-793, the greater the level of physical activity.[10-11] It can be self-administered, or directly administered in person or via telephone.[10] PASE has an established construct validity[12-14] and good test-retest reliability.[10,15] It has been translated also in several languages such as Chinese, Japanese and Thai.[11,16,17]

However, there is no local version of PASE in the Philippines. Development of a valid Filipino version of the tool is important for clinical and research purposes and will be useful in making intercultural and international comparisons between the Philippines and other nations.

This study aimed to: 1) translate the original PASE in Filipino (PASE-F); 2) establish the validity and equivalency of PASE-F; and 3) establish the association between physical activity and fall history among older adults.

METHODS

This study is a two-phase observational study. Ethical approval was secured from the Ethics Review Committee of the University of Santo Tomas– College of Rehabilitation Sciences. The participants signed a written consent form prior to participation.

Phase 1: Validation and Translation

The copy and the permission to translate the original PASE questionnaire were first sought from the New England Research Institute. An expert panel composed of three allied health professionals (medical doctor, physical therapist, and occupational therapist) in geriatric care, who have at least 10 years of experience and were independent from the research being done, conducted the content and face validation, and cultural adaptability to the Philippine setting of PASE.

The experts conducted content validation by rating the degree of relevance of each item of the tool, using a 4-point Likert scale which was adapted from previous studies.[18,19] A score of 1 means not relevant and should not be included; 2 indicates marginal relevance and does not need to be included; 3 is important and should be included; and 4 is essential and must be included. Remarks per item and for the entire questionnaire were also obtained. For face validation, the experts were asked to use the Questionnaire Appraisal System (QAS) developed by the Research Triangle Institute.[20] The QAS has eight general dimensions: reading, instructions, clarity, assumptions, knowledge/memory, sensitivity/bias, response categories, and other problems. Appropriate revisions to PASE were done by integrating the recommendations and suggestions of the experts. Some activities enumerated in the original PASE were replaced with metabolically equivalent activities more commonly done by Filipino older adults.[21]

Standard forward-backward translation procedure was followed. A language specialist, who was a bilingual university Filipino professor, translated the modified PASE to Filipino (PASE-F). Afterward, another language specialist, who was a bilingual university English professor, translated PASE-F back to English. The original PASE and the back-translated English versions were then compared. A third language specialist mediated to resolve discrepancies and concluded that the back-translated version is similar to the original PASE.

The equivalency of PASE-F to the original PASE was then investigated in a pilot test. Fifteen (15) older adults, who were literate in Filipino and English, and who passed our eligibility criteria, were recruited to answer the two versions of the questionnaire. To minimize sequence effect, there was no particular order on which version to conduct first or second. At least 30 minutes separate the administration of the two questionnaires.

Phase 2: Association of PASE-F scores and History of Falls

Participants. Filipino older adults aged 60 years or above, who may or may not have had any history of falls in the past 12 months, and who were living in Manila for at least 1 year were recruited. Furthermore, they were included if they were ambulatory without an assistive device, and have a functional range of motion of trunk, shoulder, hip and ankle that is adequate to perform balance tests. However, they were not allowed to participate if they have unhealed surgery or fractures in the past 12 months, joint pains, amputation, leg length discrepancy, chronic neurologic condition, contracture, cardiac conditions, and total blindness.[11,14]

Sample size. The sample size was computed using Open Epi. In the absence of published data on fall prevalence in the Philippines, the lower margin of falls prevalence, which is 28%, according to WHO, was used.[1] Assuming a margin of error of 5% and a 95% confidence interval, a total of 310 participants are required for the study.

Participant Recruitment and Data Gathering. This study initially intended to use stratified proportionate random sampling, however, out of six districts, approval from the Office of Senior Citizens Affairs (OSCA) of Manila to conduct the study was obtained for Districts 1 and 2 only. The OSCA permitted the conduct of our study in these districts because the association of senior citizens in these districts were well-organized. And in the course of participant recruitment, only District 1 was able to provide assistance. Four *barangays* (small local units) of District 1 consented to participate in the study. Data gathering was held in January 2014 at the community centers of each *barangay* where the older persons hold their regular meetings. Trained researchers directly administered the PASE-F questionnaire in order to reduce the chances of non-response.

Participants were also asked whether they had a history of falls in the past 12 months. A fall is defined as the unintentional change in position or coming to rest on a lower level (on the ground, floor or chair).[1]

Data Analysis

OpenStat (version 11.9.08) and Microsoft Excel 2010 were used in data recording and analysis. To determine the equivalency of PASE-F to the original, the scores of the 15 older adults during the pilot test were compared using two-sample t-test with equal variances. To establish the per item consistency of their responses, Spearman's Rho was used.

Descriptive statistics, including mean, standard deviation and percentage, were used to summarize demographic information and PA of the participants during the second phase of the study. The association between the mean PASE-F scores and a history of falls among elderly patients was analyzed using the odds ratio. Association of the PASE-F items with history of falls was examined using simple logistic regression. The threshold of significant difference was set at 0.05.

RESULTS

Validity and Cultural Adaptation of PASE

The consensus of the panel of expert on the content of PASE was that all items in the questionnaire were essential and must be included in the Filipino version. Several suggestions were made to make the scale more culturally applicable in the Philippine setting. For the first question on activities in sitting, it was suggested to qualify "reading" by changing it to "reading a book or newspaper". For the second question on walking outside the home or yard, additional examples were included such as walking to church and walking inside the mall. For light sport and recreational activities in the third question, the given examples which were golf with a cart, shuffleboard, and fishing from a

boat or pier were replaced with billiards and folkdance.

For moderate sport and recreational activities in the fourth question, tennis doubles and ballroom dancing were retained as examples, while hunting, ice skating, golf without cart, and softball were deleted because these were not commonly done in the Philippines. For strenuous sports and recreational activities in the fifth question, the term biking was used instead of cycling, and skiing was considered irrelevant in the local setting and therefore, was not included in the list of examples. The sixth question on exercises to increase strength and endurance and the seventh question on light housework were unchanged.

For question number eight on heavy housework, washing cars was included in the example. For question number nine, the lawn work on snow removal was deleted, while the lawn work on leaf removal was kept. The 10th and last question were retained with the insertion of other work examples like vendor or tending a mini-store in the first category of work-related activities.

The modification and replacement of activities in the questionnaire were based on the list of alternative activities provided in the PASE administration and scoring manual, and on the expert opinion of the panel on activities with common METS equivalence.[21]

Regarding the face validity of PASE, the expert panel agreed that there was no difficulty in using the questionnaire for older adults in terms of reading, instructions, clarity, assumptions, knowledge/memory, sensitivity/bias, response categories, and other problems. It was suggested that the font size used in the questionnaire should be big enough to be readable to older adults. Another modification was on the alignment of the choices in the inner boxes such that the choices were presented in one column instead of two.

Based on a pilot test, the validated and culturally adapted Filipino version of PASE (PASE-F) was found to be statistically not different from the original PASE with a p-value of 0.84, and Spearman's Rho of >0.05. This proves that the two versions are equivalent.

PASE-F Scores and Falls History Association

Demographic Characteristics. A total of 310 (62.3% female) older adults with a mean age of 68 ± 6.50 and age range of 60-91 were included in the study. Table 1 shows the demographic characteristics of the participants. The overall falls prevalence was calculated at 15.16%. Fallers, who reported at least one occurrence of falls in the last 12 months, show a non-significantly higher PASE-F mean score of 135.42 ±99.92, compared to non-fallers, who had no history of falls in the last 12 months, with a mean score of 114.86 ±90.21.

Table 1. Participants' Demographics

	Non-Fallers	**Fallers**	**Total**
No. of participants (%)	263 (85.84%)	47 (15.16%)	310
Mean Age (±SD)	67.75 ±6.41	68.89 ±7.36	67.92 ±6.56
Female n(%)	159 (60.46%)	34 (72.34%)	193 (62.26%)
Marital Status n(%)			
Married	28 (10.65%)	3 (6.38%)	31 (10.00%)
Single	144 (54.75%)	20 (42.55%)	164 (52.90%)
Widowed	91 (34.60%)	24 (51.06%)	115 (37.10%)

Table 2 shows the mean PASE-F scores of the participants classified as fallers and non-fallers, and stratified in three age groups: young-old (60-69), middle-old (70-79), and old-old (>79). Physical activity level, as demonstrated in the mean PASE-F scores, generally decreases with

increasing age for both male and female older adults. Male older adults aged 60-79 are more physically active compared to their female counterparts, and this was reversed when they reach 80 years and above. For fallers, the middle age group showed higher mean PASE scores compared to the young-old and old-old groups.

Table 2. Mean PASE-F scores and standard deviations of fallers and non-fallers stratified in three age groups.

Age groups	Non-Fallers (n=263)		Fallers (n=47)		Total (n=310)		
	Male (n=104)	*Female (n=159)*	*Male (n=13)*	*Female (n=34)*	*Male (n=117)*	*Female (n-193)*	*Total (n=310)*
60-69 (n=178)	125.91 ±92.72	122.06 ±101.51	141.41 ±81.18	140.75 ±132.02	127.07 ±91.01	124.92 ±106.34	125.79 ±100.21
70-79 (n=69)	108.02 ±69.49	97.06 ±76.64	162.14 ±68.88	148.62 ±64.76	110.19 ±68.88	107.18 ±76.74	108.11 ±73.99
>79 (n=16)	71 ±37.06	90.59 ±45.98	-	75.5 ±57.48	71 ±37.06	85.95 ±47.83	80.72 ±43.96

No significant association was found between PASE-F scores and fall history (p= 0.16, 95% CI [1, 1.004]. The per item analysis, however, of the questionnaire revealed that frequency of home repairs (p= 0.05, 95% CI [1.001, 1.045], engagement to outdoor gardening (p= 0.05, 95% CI [1.001, 1.054] and hours of volunteer work (p= 0.02, 95% CI [1.004, 1.068] are risk factors for falls among the participants. Simple logistic regression revealed that participants who reported increased hours of volunteer work per week, and engagement to home repairs and outdoor activities are 1.035, 1.02 and 1.031 times, respectively, more at risk for falls, compared to those who did not engage in such activities. Table 3 shows the association of the activities included in the PASE questionnaire to a history of falls.

Table 3. Association of PASE scores and individual items with history of falls using simple logistic regression

	OR	***p* value**	**95% Confidence interval**
Sitting activities	1.47	0.13	0.888, 2.443
Walking	1.15	0.58	0.699, 1.888
Sports or recreational activities			
Light	1.13	0.63	0.675, 1.902
Moderate	0.99	0.97	0.533, 1.838
Strenuous	1.12	0.48	0.816, 1.538
Strength and/or endurance exercise	0.86	0.88	0.349, 0.680
Housework			
Light	0.98	0.98	0.423, 0.943
Heavy	1.01	0.90	0.968, 1.038
Other Household activities			
Home repairs	1.02	0.05*	1.001, 1.045
Lawn work or yard work	1.01	0.35	0.90, 1.027
Outdoor gardening	1.03	0.05*	1.001, 1.054
Caring for other person	1.01	0.63	0.992, 1.013
Hours of volunteer/work	1.04	0.02*	1.004, 1.068
Total PASE Score	1.002	0.16	1.000, 1.004

* statistically significant p<0.05

DISCUSSION

The first two objectives of this study were on the process of cross-cultural adaptation of the PASE questionnaire. This is an important procedure in ensuring that validity of the instrument is maintained at a conceptual level across different cultures and languages.[22] We found that PASE-F is equivalent to the original version of PASE. Using PASE-F may facilitate better comprehension among respondents when self-administered, and ease in the measurement of physical activity level of older Filipino adults as it is written in the vernacular language.

Several translations and psychometric studies on PASE have been done in various countries.[11,14,16] Modifications in the items and cited examples of the questionnaire were made to accommodate for the unique culture and activities of the older Filipino adults. This was similarly done in the Japanese translation of PASE with some modifications in phrasing to avoid errors in the classification of activities.[16]

The third objective of the study was to establish the association between physical activity and history of falls among older adults. We found that PASE-F scores were not associated to fall history. In a cross-sectional study by Mazo et al (2017), it was concluded that more physical activity is associated with lower incidence of falls.[5] in a longitudinal study by Peeters et al (2010), on the other hand, was not able to confirm that both low and high levels of physical activity were associated with a higher risk of falling. They reported, however, that older persons with higher physical activity levels have reduced risk of recurrent falling.[23]

In the current study, fallers show insignificantly higher PASE scores compared to non-fallers. The preconceived notion that older persons with limited physical activity are more vulnerable to falling compared to those with higher physical activity level due to a possible decrease in muscle strength and proprioception associated with inactivity,[6] may not be always true. The higher physical activity level would mean more involvement in risky behaviors,[24] and activities that lead to higher falls rate. In this study, these activities are doing home repair, engagement in outdoor gardening, and more hours in volunteer work. Yokoya et al (2007), however, found that community-dwelling older adults who leave their houses more frequently have a lower risk for falls.[25]

The prevalence of falls in our study was at 15.16%, which is lower compared to the global prevalence of 28-35%.[1] This may be a conservative rate of falls among our participants who were relatively younger, starting from the retirement age of 60, compared to the WHO report of older adults who were at least 65.[1] This may also be due to our eligibility criteria of including only those who were independent in ambulation, without use of assistive device, and who had no known medical conditions.

The results of our study may be interpreted with caution due to possible recall bias of the participants in reporting their fall history, and in remembering their activities in the past week when answering the PASE questionnaire. This may lead to overestimation or underestimation of their actual PA level in the past seven days. Although PASE is considered a valid tool to measure PA, objective and direct measurement of PA using accelerometer, pedometer or doubly labeled water method, may provide more quantifiable and significant difference[7] between fallers and non-fallers.

CONCLUSION

PASE-F is a valid and equivalent translation of the original PASE. However, PASE-F scores and history of falls are not associated. Fallers may not be those with low physical activity level but those with high level of physical activity. Among the activities in the PASE questionnaires, frequency of home repair, doing outdoor gardening, and rendering hours for voluntary work are considered risk factors for falls. The conduct of prospective studies to establish if PASE scores can predict falls incidence is recommended.

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Individual author's contributions

The specific areas of contribution of the authors are provided below:

- Study concept and design: DL
- Acquisition of data: DL, EJL, SS, MT, GJE, CGC, MP. KD
- Analysis and interpretation of data: DL, EJL, SS, MT, GJE, CGC, MP
- Drafting of the manuscript: DL, EJL, SS, MT, GJE, CGC, MP, KD
- Final revision and approval revision of the manuscript: DL, EJL, SS, MT, GJE, CGC, MP, KD

Disclosure statement

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Conflicts of interest

We declare no conflicting interests.

Supplementary file

S1_PASE-F. Copy of the Physical Activity Scale for the Elderly in Filipino (PASE-F).

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