

Cross-cultural Adaptation and Psychometric Properties of the Arabic Version of the Rapid Assessment of Physical Activity

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ABSTRACT

Objectives: The purpose of the study was to cross-culturally adapt the Rapid Assessment of Physical Activity (RAPA) for Arabic speaking people and examine the test-retest reliability and the construct validity in Saudi older adults. **Methods:** Test-retest reliability was assessed over two testing visits occurring one week apart. The construct validity was examined between RAPA and Short Physical Performance Battery (SPPB) and Timed Up and Go (TUG) tests. **Results:** The original RAPA was translated into Arabic following standardized guidelines. For the test-retest reliability, the weighted kappa was 0.87 (95% confidence interval: 0.76–0.98), which indicates good reliability. There was a significant correlation between the Arabic version of RAPA and the SPPB (Spearman's correlation coefficients (r) = 0.536, $p < 0.001$), and the TUG test ($r = -0.435$, $p < 0.010$). **Conclusions:** The Arabic version of the RAPA questionnaire adapted for Saudi older adults provides an easy, valid, and reliable way to measure physical activity.

The elderly population in Saudi Arabia will increase dramatically over the next several decades. The United Nations projected that in 2017 about 5.6% of Saudi Arabia's population would be 60 or older. This percentage will increase to 22.9% by 2050.¹ This significant growth in the number of elderly presents numerous challenges to the health care system due to the high prevalence of comorbidities that require close observation and continuous care, such as diabetes, arthritis, and heart diseases.^{2,3}

Physical activity (PA) can prevent or delay disability, facilitate the management of chronic conditions, and enhance the quality of life for older adults. Physical inactivity is a global public health challenge and is one of the biggest contributors to mortality in older adults.^{4,5} In addition, physical inactivity has been associated with several chronic conditions, including cardiovascular diseases, diabetes, hypertension, and obesity, and could lead to functional disability and frailty.^{6,7} The prevalence of physical inactivity in Saudi Arabia is very high. A national population-based study carried out from 1995 to 2000 found a 96% prevalence of physical inactivity among both Saudi males and females. Another national survey reported a prevalence of physical inactivity of 67% among the Saudi population.^{8,9}

The American Heart Association recommends that adults aged 65 and older engage in either 150 minutes/week of moderate-intensity aerobic activity or 75 minutes/week of a combination of moderate- and high-intensity aerobic activity.¹⁰ Therefore, given the importance of PA for older adults, it is imperative to have well-validated outcome measures to assess PA levels. PA questionnaires have been used to enhance our understanding of the individual, environmental, and social aspects associated with daily PA and to guide future public health recommendations and interventions. Several PA questionnaires are available and have been validated for use with the elderly, such as Patient-Centered Assessment and Counseling for Exercise (PACE),¹¹ the Community Healthy Activities Model Program for Seniors (CHAMPS),¹² and Rapid Assessment Physical Activity (RAPA).¹³ However, most of the existing PA questionnaires are in English and have not been translated or culturally adapted for Arabic speakers.

The RAPA questionnaire is a self-reporting tool that presents the following characteristics that makes it a good tool for measuring PA in clinical settings: a) uses pictures to represent different PAs and facilitate user understanding, b) requires little time in its application (approximately two minutes); and c) can be used as a health educational tool.¹³ Other PA instruments such as CHAMPS and PACE are

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longer tests that take more time to conduct and also examine other health behavioral factors and not just PA-related questions.

Additionally, RAPA was found to have high sensitivity (81%), specificity (69%), negative predictive ability (75%), and validity in older adults.¹³ It includes an assessment of strength and flexibility that are crucial in reducing the risk of falling and increasing the independence of older adults.¹³ The RAPA questionnaire has been translated into Turkish,¹⁴ Mexican-Spanish,¹⁵ Chilean-Spanish,¹⁶ Vietnamese,¹³ and Portuguese.¹⁷ As a limited number of PA questionnaires have been translated and culturally adapted for Arabic speakers, the main aim of this study was to translate and culturally adapt the RAPA for use in Saudi Arabia and to examine the validity and reliability of the Arabic version of RAPA questionnaire.

METHODS

This cross-sectional study was carried out in a community-based setting in the Al Kharj area from February 2018 to July 2018. Subjects were included in this study if they met the following inclusion criteria: a) age 60 years or older; b) able to ambulate with or without an assistive device; c) cognitively able to provide informed consent; and d) able to read Arabic. Those who had any medical or neurological conditions that prevented them from performing PA were excluded. All participants gave a written informed consent before enrollment. The study was conducted according to the Declaration of Helsinki and was approved by the ethical committee at Prince Sattam Bin Abdulaziz University.

Permission to translate and culturally adapt the RAPA to Arabic was granted from the original author of the RAPA questionnaire.¹³ The process of the translation and cross-cultural adaptation was done according to the Beaton guidelines.¹⁸ The process included the following steps: forward translation, synthesis of the translation, backward translation, expert committee, and testing the pre-final version. First, the RAPA questionnaire was forward translated from English into Arabic by two independent Arabic native speakers, both of whom were bilingual (a physical therapist with experience in PA outcomes and a professional English translator). Second, the two translated versions were reviewed by an expert committee, and a reconciled version

was produced. Next, the reconciled Arabic version was backward translated into the original language by two other bilingual independent translators with no knowledge of the original instrument. Then, the backward translated English version was evaluated by an expert committee, and consensus on any discrepancies was reached. The original developer of the RAPA questionnaire approved the pre-final version. Then, the pre-final version of the RAPA was tested on 10 older adults to identify whether all the items of the questionnaire were clear and easy to understand. Finally, the pre-final version was approved and ready to use. For cultural adaptation, walking with pets is not common in the Arabic culture, so the picture of a man walking his dog was changed to a man walking with a cane only. In addition, the picture of a man cleaning with a vacuum was changed to a woman cleaning with a vacuum because in the Arabic culture, usually, women are responsible for housekeeping activities.

Subjects completed the RAPA questionnaire, the Short Physical Performance Battery (SPPB) test, and Timed Up and Go (TUG) test. To examine the test-retest reliability, participants repeated the RAPA questionnaire after at least one week from the first testing. A one week interval was chosen to ensure participants could not change PA with this short time and long enough to prevent recall bias.¹⁹

The RAPA is a self-report PA measurement that was developed in English at the University of Washington.¹³ It is a nine-item survey about the level of PA, strength, and flexibility exercises. The response to these questions is either yes or no. The RAPA has two parts: the first part (i.e., RAPA1) is about PA, and the second part (i.e., RAPA2) is about strength and flexibility training. There are three levels of PA; light, moderate, and vigorous. Each level is well described in the instructions, and examples with graphics for each level are included. To score RAPA1, responses with yes to the question with the highest score was used. The RAPA1 total score broadly classifies subjects into five different levels of PA: sedentary, underactive, regular underactive (light activities), regular underactive, and regular active. Responses to RAPA2 are scored one point for the strength training, two points for flexibility, or three points for both strength and flexibility. Numerous studies have examined the validity of the RAPA questionnaire in older adults. The RAPA was positively correlated with the level of

PA using the CHAMPS criterion¹², and the PACE questionnaire.¹¹ In addition, the RAPA questionnaire has demonstrated an adequate sensitivity, specificity, positive and negative predictive values for defining levels of PA when using the CHAMPS.¹³

The SPPB was developed as a measure of physical performance for a longitudinal study of aging conducted by the National Institute on Ageing.²⁰ The SPPB test included the following components: standing balance tests, gait speed, and five-times chair rise test. The standing balance task examines the ability to maintain balance for 10 seconds when standing with feet together, semi-tandem, and tandem stance. The four-meter gait speed measured the time needed to walk four meters at a normal pace. The five-times chair rise test required subjects to rise from a chair five consecutive times with their arms across their chest. Scores from 0 to 4 are assigned to each of the tasks based on quartile scores of the timed chair stands and ambulation, and degree of difficulty of the standing balance test. A summary performance score is equal to the sum of the three sub-scores, with a possible range from 0–12. The SPPB test has been shown to have a high level of reliability and validity in measuring functional mobility and physical performance in elderly populations.²⁰

The TUG test was used to assess the basic functional mobility of older adults.²¹ Participants were asked to stand up from a chair with armrests, walk three meters, turn around, walk back, and sit down. A practice trial was done before the testing, and subjects were allowed to use assistive devices if needed. TUG has shown good reliability and validity to measure functional mobility in elderly persons.

Demographics data were collected, including age and gender. Body mass index (BMI) was calculated using body mass divided by the square of height and included as a continuous variable. Comorbidities were collected using a self-report by participants, and the number of comorbidities were used in this study.

A total of 96 older adults were enrolled as participants. The sample size was larger than the recommended sample size for studies that examine psychometric properties of a scale, which is 10 subjects per item of the scale.²²

Data were analyzed using statistical software Stata version 15.1 (Stata Corp, College Station, TX). Descriptive data for subject demographics and clinical characteristics were reported. For continuous variables, the mean and standard deviation were

Table 1: Subjects' demographic and clinical characteristics (n = 96).

Variable	Mean ± SD
Age, years	71.0 ± 5.3
Gender, n (%)	
Men	64 (66.7)
Women	32 (33.3)
Level of education, n (%)	
No formal education	19 (19.8)
Primary school	52 (54.2)
Middle school or more	25 (26.0)
Marital status, n (%)	
Single	15 (15.6)
Married	81 (84.4)
BMI, kg/m ²	26.1 ± 4.5
Number of comorbidities	6.0 ± 3.0
SPPB total	8.8 ± 2.7
TUG	14.9 ± 6.4

SD: standard deviation; BMI: body mass index; SPPB: short physical performance battery; TUG: timed up and go.

reported, and numbers with percentages were used for categorical variables. Test-retest reliability was examined using weighted kappa (k). A weighted k value > 0.60 was considered as good reliability.²³ Construct validity was assessed by using Spearman's correlation coefficients (r) between the RAPA, SPPB, and TUG tests and other measures (i.e., age, BMI, and number of comorbidities). A weighted k value of 0.70 for the reliability and a value ≥ 0.30 for the construct validity have been considered acceptable for PA measurements.¹⁹ The level of statistical significance was set at a = 0.05 for all analyses.

RESULTS

A total of 96 community-dwelling older adults were recruited to take part in the study. The average age of the current sample was 71.0±5.3 (range 64–83 years). Sixty-seven percent (64/96) of the participants were male [Table 1]. Data from the RAPA show about 19 (19.8%) participants were categorized as sedentary, 25 (26.0%) as underactive, 14 (14.6%) as regular underactive, 27 (28.1%) as regular underactive (light activities), and 11 (11.5%) as regular active. About half of the subjects (52.1%) reported that they did not participate in flexibility or strength activities [Table 2].

RAPA was significantly positively associated with higher scores of SPPB ($r = 0.536$, $p < 0.001$), and negatively with total time to finish the TUG test

Table 2: Number of participants for each category of the RAPA questionnaire (n = 96).

Measurements	n (%)
RAPA1	
Sedentary	19 (19.8)
Underactive	25 (26.0)
Regular underactive (light activities)	14 (14.6)
Regular underactive	27 (28.1)
Regular active	11 (11.5)
RAPA2	
Strength training	2 (2.1)
Flexibility training	21 (21.9)
Both	23 (24.0)
None	50 (52.1)

RAPA: Rapid Assessment of Physical Activity.

($r = -0.435$, $p < 0.010$). These results suggest that increased PA was related to better performance on the SPPB test and a shorter time to complete the TUG test.

For the test-retest reliability, the weighted k was 0.87 (95% confidence interval (CI): 0.76–0.98), indicating that the reliability of the Arabic RAPA1 was very good. The test-retest reliability was also very good for the Arabic RAPA2; weighted k was 0.83 (95% CI: 0.70–0.96).

Both RAPA1 and 2 were negatively and significantly correlated with age, BMI, and the number of comorbidities, indicating that lower PA levels were associated with an increase in age, BMI, and an increase in the number of chronic conditions ($r = -0.348$ – -0.414 , $p < 0.010$).

DISCUSSION

We aimed to cross-culturally adapt and translate RAPA into Arabic and test its psychometric properties among older adults living in Al Kharj, Saudi Arabia. The findings indicate that the Arabic version of RAPA is easy, understandable, and culturally relevant for older adults. This scale is a valid and reliable tool to measure PA among Saudi older adults.

The test-retest reliability of the Arabic version of RAPA total and its components was higher than that of the Mexican-Spanish (intra-class coefficient = 0.65)¹⁵ and Portuguese versions (weighted $k = 0.67$),¹⁷ and lower than that of the Turkish version RAPA (weighted $k = 0.91$).¹⁴ Although the original RAPA study did not examine the test-retest

reliability, the current study and the Turkish version showed very good test-retest reliability. This might be due to the successful cross-cultural adaptation of some items of the original scale into similar cultures (such as walking with the dog and a man cleaning with a vacuum). Further, the previously adapted Mexican-Spanish and Portuguese RAPA version utilized a different analytical approach (e.g., an intra-class coefficient) that is not suitable for categorical variables. The most appropriate approach for this scale is to use a weighted k . Further research is needed to investigate the test-retest reliability for the original RAPA scale.

Spearman's correlation analyses were used to establish construct validity between the Arabic RAPA components and the validated measures. The current study found that the correlation between the Arabic RAPA and validation measures was acceptable, ranging from 0.340 to 0.536. These findings are consistent with previous studies using similar validated measures.^{14,17} For example, the correlation between the Portuguese version of RAPA and SPPB total score was 0.430 and was 0.536 in this study, with both being in the moderate or fair range. However, there is a lack of data on the correlation between the original English RAPA with SPPB and TUG. Therefore, a comparison with these measures cannot be made.

This study found that a shorter time to finish the TUG test was associated with higher Arabic version RAPA score ($r = -0.44$). Despite the lack of research using TUG as a validated measure with RAPA, these findings were consistent with previous research that utilized TUG with other PA questionnaires, such as the Arabic version of the Physical Activity Scale for the Elderly ($r = -0.45$).²⁴ The inverse association between TUG and PA suggests that older adults with a longer time to perform dynamic balance tests had a lower PA level. Older adults should participate in regular PA to improve their health and prevent falls.

The Arabic version of RAPA was inversely associated with age, BMI, and the number of comorbidities. Previous research reported that older age and a greater number of comorbidities were associated with lower PA among older adults.^{25,26} In line with our study, previous evidence showed that BMI was associated with PA using a different PA questionnaire.²⁷ Further research is required to address the mechanism behind associations between BMI and PA.

The current study has clinical implications for using the translated Arabic RAPA questionnaire in Saudi Arabia for many reasons. Easy administration, low cost, relatively short time to administer, and suitability for Saudi older adults are factors that encourage clinicians, researchers, and policymakers to use the Arabic RAPA. Therefore, our Arabic RAPA questionnaire addresses the PA in this population. The items were carefully developed and translated in addition to using pictures for easy understanding of the PA level by older adults.

Our study has some limitations. A single geographic area where the current sample was collected may affect the generalizability of the results across the country. Some translated items may have some differences between regions, as some regions have different Arabic accents. Although the measures used were valid and reliable among different populations, the objective measures such as accelerometer are preferable to quantify the level of PA and compare the results with those of subjective measures.

CONCLUSION

This study showed that the Arabic version of RAPA is a valid and reliable measure for PA among the elderly in Saudi Arabia. Researchers in Saudi Arabia can use this questionnaire to quickly assess individuals' PA levels because of the short time required to complete and its suitability to the Saudi culture. This measure was correlated with other validated physical and performance measures for older adults.

Disclosure

An abstract form of this work has been published in *Medicine & Science in Sport and Exercise*. The authors declared no conflict of interest. No funding was received for this study.

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