

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

DHARTI SHAH¹, SUBHASH KHATRI²

ABSTRACT

Introduction: Physical activity is an important factor for healthy ageing and inactivity can lead to various disorders. The Rapid Assessment of Physical Activity (RAPA) is an established method for assessing physical activity in adults aged over 50 years.

Aim: To compare the cross-cultural adaptation and translation of English RAPA into Gujarati language and to identify the psychometric properties of the Gujarati RAPA.

Materials and Methods: This cross-sectional study was carried out from October 2021 to February 2022 with the original author's permission and the study was completed in three phases (i) Translation and cross-cultural adaptation (ii) Face and content validity (iii) Test-retest reliability. The author's suggested procedure was undertaken for translation and the consensus

method was used for face and content validity. Total nine experts from different fields examined each item of the Gujarati RAPA. Total 108 participants were included in the study and to find test-retest reliability, one week interval was used.

Results: Total 108 participants with mean age of 61.6 ± 7.82 years were studied. The Content Validity Ratio (CVR) for item 1 was 0.88 and for all other items, the value was 1. Item-Content Validity Index (I-CVI) value of all the items of Gujarati RAPA was $>0.79\%$. Test-retest reliability measured by weighted kappa κ (for RAPA1: 0.82 and RAPA2: 0.73) was very good.

Conclusion: Gujarati RAPA had good face and content validity and very good test-retest reliability. Hence, it is a useful tool for the assessment of physical activity in Gujarati speaking population.

Keywords: Cross-cultural comparison, Exercise, Language, Translation

INTRODUCTION

Ageing is an important part of human life. Prediction based on research says that approximately 20% of the Indian population will be more than 60 years of age in 2050. This major change in demographics will impose greater challenges at both social and economic levels [1].

Physical activity is one of the important factors which can affect the rate of ageing [2]. Physical inactivity is associated with mortality in older adults and it is a global public health challenge [3]. Based on studies, regular participation of elderly people in physical activity training can improve cardiovascular functions, improve work capacity and functional ability, lower the blood pressure, and can also reduce the risk of chronic diseases [4].

Adults aged 65 years and older are recommended to engage in 150 minutes per week of moderate intensity aerobic activities. Alternatively, the American Heart Association recommends 75 minutes per week of high and moderate intensity aerobic activities [3]. In numerous research, measuring physical activity levels is a key indicator of how well therapeutic or pharmaceutical treatments are working. Given the importance of physical exercise, it is crucial to have a strong tool for evaluating it [5]. For the understanding and guidance of public health recommendations, several physical activity questionnaires have been validated in older adults [5]. A large number of existing physical activity questionnaires have not been translated or localised for Gujarati speakers and are primarily drafted in English. Since RAPA have high ability to find true positive/negative rate and also have a good positive/negative screening ability, it stands out different from existing physical activity questionnaire.

The original RAPA questionnaire contains nine questions with a response option of yes or no and is divided into two parts. RAPA1 includes a physical activity level ranging from sedentary to regular. RAPA2 includes questions regarding strength and flexibility training. To understand each level of physical activity, descriptions were

accompanied by graphic and text depictions [6]. So, the present study was aimed at cross-cultural adaptation and translation of English RAPA into Gujarati and to identify psychometric properties of the Gujarati version of RAPA.

MATERIALS AND METHODS

The present cross-sectional study was carried out in Ahmedabad city of Gujarat from October 2021 to February 2022. Ethical approval was taken by the Institutional Ethical Committee of Nootan College of Physiotherapy with Ref no. NCP/305-A/2021. Before enrollment, all the participants gave written informed consent.

Inclusion criteria:

1. Age ≥ 50 years
2. Both male or female participants
3. Able to ambulate with or without the assistive devices
4. Able to read the Gujarati language

Exclusion criteria:

1. Anyone with medical, surgical, or neurological condition that limited their physical activity
2. Severe cognitive impairment

Sample size calculation: In line with the recommendation of sample size being at least 10 times the number of questions of questionnaire [5], the sample size was determined to be 90 participants as per 9 items of the RAPA. But by considering 20% dropouts, 108 participants were considered for final analysis.

Translation and Cross-cultural Adaptation

Permission from the original RAPA author was taken for cultural adaptation and translation of the RAPA to the Gujarati language [6]. In line with the Beaton guidelines and the original author's suggestions, the process of translation and cultural adaptation was carried out [7].

The process consisted of forward translation, reconciliation, backward translation, comparison with the original source, and cognitive debriefing.

1) Forward translation: Two bilingual independent Gujarati native speakers (one with a healthcare background and one without a healthcare background) forward translated the RAPA questionnaire from English to Gujarati.

2) Reconciliation: A reconciled questionnaire was formed by combining the forward translated versions of the initial translators.

3) Back translation: Two bilingual independent translators (one who had no knowledge of the original RAPA questionnaire and one with knowledge of the RAPA) backward translated the reconciled Gujarati version into the English language. Both the backward translated versions were combined and made reconciled one backward translation.

4) Harmonisation and cultural adaptation: A researcher compared the reconciled and backward translated versions with the original source. For cultural adaptation, walking with a pet in light activities was changed to a man walking with a baby in a stroller; because walking with a pet is not common in Gujarati culture. An example of a light activity showing the picture of a man cleaning with a vacuum was replaced with a woman using a vacuum because women are often responsible for housekeeping activities in the Gujarati culture. The picture of swimming gently in moderate activities was replaced by a stair climbing activity due to cultural differences. In vigorous activity, racquetball and pickleball game was replaced by cricket because cricket is common gameplay of Gujarat.

5) Cognitive debriefing: Total 12 older adults (with age >50 years) out of 108 participants were asked to fill a prefinal version. In an interview, participants were asked regarding words, language and terminology, instruction, and lucidity of choices available in responses and based on their feedback, the prefinal questionnaire was considered acceptable.

The prefinal version was shared with the original author of RAPA for approval and after approval, the prefinal version was considered ready to use.

Validity and Reliability Procedures

The study process was carried out in two stages:

1. Face and content validity: Gujarati RAPA was given to nine experts with a mean experience of 11.5 years which included Geriatric physician and Physiotherapist from different fields. The consensus method was used to find face and content validity of Gujarati version of RAPA. Each item of the Gujarati RAPA was reviewed for content, phrasing, meaning, format, and simplicity of administration by all nine experts. By considering suggestions from experts, 80% consensus was achieved. All items of the Gujarati RAPA were accepted by all nine experts for above mentioned criteria.

For content validity, all the nine experts were requested to rate each item on the questionnaire on a scale of 1 to 3, with 1 denoting “not necessary”, 2 denoting “useful but not essential” and 3 denoting “essential” [8].

The following formula was used to determine the Content Validity Ratio (CVR):

$$CVR = (N_e - N/2) / (N/2)$$

Where N_e = Number of experts denoting “essential”

N = Total number of experts [8].

CVR value 0.78 was approved by Lawshe CH [9].

For Item level Content Validation Index (I-CVI) all experts were asked to score items on a 4-point ordinal scale where 1 indicating not relevant, 2 indicating somewhat relevant, 3 indicating quite relevant and 4 indicating highly relevant. It was calculated using the below formula:

$$I-CVI = \text{Number of experts offering 3 or 4} / \text{total number of experts}$$

For interpretation >79%-appropriate, 70-79%-needs revision and <70%-eliminated [8].

2. Reliability: For the test-retest reliability study, 108 participants were recruited. All participants provided their written informed consent. Each participant received Gujarati RAPA twice, separated by a week.

STATISTICAL ANALYSIS

For statistical analysis, Statistical Package for the Social Sciences (SPSS) version 26.0 was utilised. To describe characteristics of participants, descriptive statistics such as mean and standard deviation were used. Test-retest reliability was assessed using weighted Kappa (κ). An online calculator (Vassar Stats) was used to calculate weighted kappa (κ). A weighted k-value of ≥ 0.7 for reliability was considered acceptable for physical activity instruments [10]. The level of significance was kept at $p < 0.05$.

RESULTS

Total 108 participants aged more than 50 years participated in the study. Among these participants, 50 were males and 58 were females. [Table/Fig-1] shows the mean and standard deviation of age and Body Mass Index (BMI).

Variables	Mean \pm SD
Age (years)	61.6 \pm 7.82
BMI (kg/m ²)	23.75 \pm 4.07

[Table/Fig-1]: Demographic characteristics of the participants

Content and face validity: All the experts ($n=9$) indicated 3 “essential” for eight items of the Gujarati RAPA out of nine items. Item 1 was scored 2 “useful but not essential” by one expert. So, the CVR value of item 1 was 0.88 and for all other items was 1. All CVR values were more than 0.78, which suggested approval for each item [Table/Fig-2].

Experts opinion about acceptability of items in Gujarati RAPA										No. of experts denoted “Essential”	CVR
No. of items of scale	Ex1	Ex2	Ex3	Ex4	Ex5	Ex6	Ex7	Ex8	Ex9		
1	3	2	3	3	3	3	3	3	3	8	0.88
2	3	3	3	3	3	3	3	3	3	9	1
3	3	3	3	3	3	3	3	3	3	9	1
4	3	3	3	3	3	3	3	3	3	9	1
5	3	3	3	3	3	3	3	3	3	9	1
6	3	3	3	3	3	3	3	3	3	9	1
7	3	3	3	3	3	3	3	3	3	9	1
8	3	3	3	3	3	3	3	3	3	9	1
9	3	3	3	3	3	3	3	3	3	9	1

[Table/Fig-2]: CVR values for nine items of the Gujarati RAPA.

Ex1, Ex2, Ex3, etc., suggest number of experts

All I-CVI values for each item were >0.79% suggesting that every item in the Gujarati RAPA was appropriate [Table/Fig-3].

For face validation, 12 participants gave their opinion regarding the wording, meaning, format, and easy understandability of each item. According to them, all the items were acceptable and could be used for evaluation of physical activity.

Using the first application of the Gujarati RAPA, 18 (16.6%) participants were categorised as sedentary, 27 (25%) as underactive, 47 (43.5%) as underactive regular, and 16 (14.8%) as active participants for RAPA1. For RAPA2, 34 (31.5%) participants reported a lack of participation in strength or flexibility activities [Table/Fig-4].

Reliability: Test-retest reliability was very good for Gujarati RAPA1 as indicated by the weighted k-value of 0.82 (95% CI: 0.75-0.91). A good reliability was also noted for Gujarati RAPA2 with a weighted k-value 0.73 (95% CI: 0.64-0.82).

Experts opinion about item level acceptability of each item of Gujarati RAPA										No. of experts denoted 3 or 4	I-CVI
No. of items of scale	Ex1	Ex2	Ex3	Ex4	Ex5	Ex6	Ex7	Ex8	Ex9		
1	3	2	3	4	4	4	4	4	4	8	0.88
2	3	4	3	4	4	4	4	4	4	9	1
3	4	4	4	4	4	4	4	4	4	9	1
4	4	4	4	4	4	4	4	4	4	9	1
5	4	4	4	4	4	4	4	4	4	9	1
6	4	4	4	4	4	4	4	4	4	9	1
7	4	4	4	4	4	4	4	4	4	9	1
8	4	4	4	4	4	4	4	4	4	9	1
9	4	4	4	4	4	4	4	4	4	9	1

[Table/Fig-3]: I-CVI values for nine items of the Gujarati RAPA. Ex1, Ex2, Ex3, etc., suggest no. of experts

Measurements	n (%)
RAPA1	
Sedentary	18 (16.6)
Underactive	27 (25)
Underactive regular	47 (43.5)
Active	16 (14.8)
RAPA2	
None	34 (31.5)
Strength	23 (21.3)
Flexibility	34 (31.5)
Both	17 (15.7)

[Table/Fig-4]: Number of participants for each different category of Gujarati RAPA 1 and 2 (N=108). RAPA: Rapid assessment of physical activity

DISCUSSION

The present study aimed at cross-cultural adaptation and translation of RAPA into the Gujarati language and to test its psychometric properties among older adults aged over 50 years. The results indicated that the Gujarati RAPA is a culturally relevant, easy, valid, and reliable tool for assessing physical activity and also for research purposes.

The original English version of RAPA was developed by the University of Washington Health Promotion Research Center (UW HPRC) in the year 2006 [6]. The original study by Topolski TD et al., concluded that RAPA was positively correlated with other physical activity assessment instruments. The result showed that the original English RAPA had better sensitivity (81%), negative predictive value (75%), and positive predictive value (77%) [6].

In the present study, more than 15% samples were reported as sedentary and approximately 14% samples were reported as active. So, it can be concluded that only 14% of the study samples fulfilled the 150 minutes of moderate-intensity physical activity throughout the week recommended by WHO [10]. In the present study, only face and content validity was performed but various translation of RAPA (into Portuguese, Turkish, Arabic and Mexican Spanish) had also shown good validity when compared to other subjective outcome measures of physical activity [3,5,6,10,11] [Table/Fig-5].

The weighted k-value for test-retest reliability of Gujarati RAPA was >0.7. Current study showed that proper cross-cultural adaptation could lead to good test-retest reliability. Mexican Spanish version had used ICC (Intra Class Coefficient) [11] which is not a suitable statistic for this type of data [3]. The weighted k-value is the proper suggested statistic for categorical variables. The original study did not evaluated the test-retest reliability of RAPA, though it is an important measure [6]. But other language versions have tested

Various translation of RAPA	Authors	Place of study	Publication year	Reliability (Test-retest)	Validity
Original development English version	Topolski TD et al., [6]	Washington	2006	Not given	RAPA and CHAMPS (r=0.54), RAPA and BRFSS (r=0.40), RAPA and PACE (r=0.44)
Portuguese	Silva AG et al., [10]	Portugal	2014	Weighted kappa (k)-0.67	RAPA and WHODAS 2.0 (r=-0.47, p<0.01), RAPA and gait test (r=-0.45, p<0.01), RAPA and total SPPB score (r=0.45, p<0.01).
Turkish	Çekok FK et al., [5]	Turkey	2017	Weighted kappa (k)-0.91 for RAPA 1, Weighted kappa (k)-.89 for RAPA 2	RAPA 1 (aerobic) and PASE (r=0.491, p<0.001), RAPA and IPAQ-SF total score (r=0.643, p<0.001)
Arabic	Alqahtani BA and Alenazi AM [3]	Al Kharj, Saudi Arabia	2020	Weighted kappa (k)-0.87 for RAPA 1, Weighted kappa (k)-0.89 for RAPA 2	RAPA and the SPPB (r=0.536, p<0.001), RAPA and TUG test (r=-0.435, p<0.010)
Mexican Spanish	Vega-lópez S et al., [11]	Phoenix, USA	2014	ICC: 0.65	RAPA and minutes of MVPA (r=0.45, p<0.05)
Gujarati	Present study	Ahmedabad, Gujarat	2022	Weighted kappa (k)-0.82 for RAPA 1, Weighted kappa (k)-0.73 for RAPA 2	Face and content validity is good. Other validity not done.

[Table/Fig-5]: Values of weighted kappa (k) or ICC and Validity for various translation of RAPA.

ICC: Intraclass correlation coefficient; r: Correlation coefficients; SPPB: Short physical performance battery test; TUG: Timed up and go test; PASE: Physical activity scale for the elderly; IPAQ-SF: The International physical activity questionnaire-short form; WHODAS 2.0: WHO disability assessment schedule; MVPA: Minutes per day of moderate and vigorous PA; PACE: Patient-centered assessment and counselling for exercise; BRFSS: Behavioral risk factor surveillance system; CHAMPS: Community healthy activities model program for seniors

test-retest reliability. Weighted k-value of Portuguese RAPA (0.67, 95% CI: 0.52-0.81) [10], Turkish RAPA (0.81) [5], and Arabic RAPA (0.87, 95% CI: 0.76-0.98) [3] were reported in their respective studies [Table/Fig-5] [3,5,6,10,11].

Proper validated instruments are required for assessment and monitoring purpose of physical and thus, the Gujarati RAPA was able to assess the physical activity in the sample population. The different items were developed and translated into Gujarati and pictures were added for ease of understanding by older people.

Limitation(s)

A single geographic area was chosen and hence, the generalisability of the results may be affected. The mode of administration of the RAPA to the participants (self-administered or interview administered) was not taken into consideration during data collection.

CONCLUSION(S)

This study established the Gujarati RAPA as a simple, valid, acceptable, and reliable tool for measuring the physical activity of Gujarati older individuals over the age of 50 years. Researchers of Gujarat can use this assessment method for research because it requires less time and is suitably adapted for Gujarati culture. Other validity and reliability of Gujarati RAPA can be done on a larger sample size of older adults. For better results, validity can be compared to some objective measures of energy expenditure such as acceleration sensors or the doubly labelled water method. In the future, research can be done on whether Gujarati RAPA is sensitive to changes related to intervention studies aimed at improving physical activity or not.

Acknowledgement

The authors would like to thank the original developers of the English version of the questionnaire and acknowledge specially to Ms. Tari D. Topolski for giving permission to translate and for final approval of Gujarati RAPA. Authors are also thankful to all the translators and experts for help in the translation and validation procedures.

REFERENCES

- [1] Chawla G. Healthy aging research in India. *J Exp Res Hum Growth Aging*. 2019;2(1):000105.
- [2] Andrieieva O, Hakman A, Kashuba V, Vasylenko M, Patsaliuk K, Koshura A, et al. Effects of physical activity on aging processes in elderly persons. *J Phys Educ Sport*. 2019;19(4):1308-14.
- [3] Alqahtani BA, Alenazi AM. Cross-cultural adaptation and psychometric properties of the Arabic version of the rapid assessment of physical activity. *Oman Med J*. 2020;35(5):e170.
- [4] Williyanto S, Kusmaedi N, Sumardiyanto S, Nugroho WA. Relationship between sex, age, body mass index, and physical fitness with elderly participation. *ACTIVE: Journal of Physical Education, Sport, Health and Recreation*. 2021;10(1):05-10.
- [5] Çekok FK, Kahraman T, Kalkışım M, Genç A, Keskinoglu P. Cross-cultural adaptation and psychometric study of the Turkish version of the rapid assessment of physical activity. *Geriatr Gerontol Int*. 2017;17(11):1837-42.
- [6] Topolski TD, LoGerfo J, Patrick DL, Williams B, Walwick J, Patrick MM, et al. Peer reviewed: The Rapid Assessment of Physical Activity (RAPA) among older adults. *Prev Chronic Dis*. 2006;3(4):A118.
- [7] Beaton DE, Bombardier C, Guillemin F, Ferraz MB. Guidelines for the process of cross-cultural adaptation of self-report measures. *Spine*. 2000;25(24):3186-91.
- [8] Zamanzadeh V, Ghahramanian A, Rassouli M, Abbaszadeh A, Alavi-Majd H, Nikanfar AR, et al. Design and implementation content validity study: Development of an instrument for measuring patient-centered communication. *J Caring Sci*. 2015;4(2):165.
- [9] Lawshe CH. A quantitative approach to content validity. *J Pers Psychol*. 1975;28(4):563-75.
- [10] Silva AG, Queirós A, Alvarelhão J, Rocha NP. Validity and reliability of the Portuguese version of the rapid assessment of physical activity questionnaire. *Int J Ther Rehabil*. 2014;21(10):469-74.
- [11] Vega-lópez S, Chavez A, Farr KJ, Ainsworth BE. Validity and reliability of two brief physical activity questionnaires among Spanish-speaking individuals of Mexican descent. *BMC Res Notes*. 2014;7:29.

PARTICULARS OF CONTRIBUTORS:

1. PhD Scholar, Faculty of Physiotherapy, Sankalchand Patel University, Mehsana, Gujarat, India.
2. Principal, Faculty of Physiotherapy, Nootan College of Physiotherapy, Sankalchand Patel University, Mehsana, Gujarat, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dharti Shah,
11, Indravilla, Navjivan Soc No. 2, Vadodara, Gujarat, India.
E-mail: dharti16shah@gmail.com

AUTHOR DECLARATION:

- Financial or Other Competing Interests: None
- Was Ethics Committee Approval obtained for this study? Yes
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. NA

PLAGIARISM CHECKING METHODS: [Jain H et al.]

- Plagiarism X-checker: Jun 15, 2022
- Manual Googling: Jun 25, 2022
- iThenticate Software: Jul 27, 2022 (9%)

ETYMOLOGY: Author Origin

Date of Submission: **Jun 08, 2022**
Date of Peer Review: **Jun 24, 2022**
Date of Acceptance: **Jul 20, 2022**
Date of Publishing: **Aug 01, 2022**