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ΕΡΕΥΝΗΤΙΚΗ ΕΡΓΑΣΙΑ

Cross-cultural adaptation of the Exercise Adherence Rating Scale for Greek older adults

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ΑΡΧΕΙΑ ΕΛΛΗΝΙΚΗΣ ΙΑΤΡΙΚΗΣ 2023, 40(6):833–838

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Διαπολιτισμική διασκευή της κλίμακας Exercise Adherence Rating Scale σε Έλληνες ηλικιωμένους

Περίληψη στο τέλος του άρθρου

OBJECTIVE **To adapt the Exercise Adherence Rating Scale (EARS) into Greek and evaluate its measurement properties in community-dwelling older adults.** METHOD **Thirty-five older adults between 61 and 86 years (24 women, 11 men; mean age 72.45±6.4 years) were enrolled in this study. Permission for the cross-cultural adaptation was received from the developer of the EARS. Cross-cultural adaptation of the EARS was performed based on Beaton guidelines (forward translation, synthesis, back translation, expert committee review, and pre-testing). Participants were oriented on undertaking the prescribed home-based exercise program in the first session, and adherence behavior was assessed after one week, and finally reassessed after two weeks (test-retest reliability). Six weeks after the first assessment, they were invited again to fill the EARS for responsiveness. The intraclass correlation coefficient ($ICC_{2,1}$) and Cronbach's α were used to assess test-retest reliability and internal consistency. The minimum detectable change (MDC) for each measure was calculated to quantify intervention effects.** RESULTS **The Greek version of the EARS questionnaire (EARS-GR) was translated without major difficulties. The forward and back translation revealed no content or language-related issues. Results showed high internal consistency (Cronbach's alpha of 0.92) and excellent test-retest reliability (ICC=0.9, 95% confidence interval [CI]=0.81–0.95) for 6-item adherence behavior.** CONCLUSIONS **The EARS-GR was cross-culturally adapted into Greek and was found comprehensible and reliable and may, thus, be used across Greek-speaking clinical settings and research. Further studies are recommended to investigate other psychometric properties of the EARS-GR with a larger sample, including various diseases.**

Key words

Adaptation
Adherence
Exercise
Older adults
Reliability

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Adherence is an important factor contributing to the effectiveness of exercise-based rehabilitation.[1] It is defined as the "*extent to which a person's behavior corresponds with agreed recommendations from a healthcare provider*".[2] Adherence to prescribed exercise is a complex and multidimensional construct and can be influenced by various factors (e.g. psychosocial factors, self-efficacy, interaction between the health professional and the participant etc.),[1] and is often poor.[3,4]

The importance of exercise in successful intervention programs for a variety of conditions and chronic diseases has long been recognized.[5,6] Health professionals use evidence-based exercise in the prevention and treatment of many conditions of older adults.[7,8] Although exercise is important and is so called a "medicine" that everyone should take regularly, activity levels tend to progressively decline with increasing age.[9] The low rates of regular exercise represent a significant public health challenge,[8,10] and, although health professionals usually have some knowledge and some idea on their patients' adherence levels to exercises, this cannot be easily measured or accurate. Therefore, it is important that adherence to prescribed exercise is adequately evaluated and measured. Although numerous methods for reporting exercise adherence exist, there is no gold standard for measuring adherence to prescribed home exercise.[2,3] Self-reported diaries and electronic devices (e.g. pedometers, accelerometers etc.) are commonly used. However, for diaries, lack of standardization, inaccurate recall and self-presentation bias limit their validity.[2] In addition, electronic devices do not capture specific prescribed exercises.[2,11]

The Exercise Adherence Rating Scale (EARS) is a brief

self-reported measure, comprising three sections; the second section (B) of which, is used to assess adherence behavior and consists of six items. This scale is a 6-item measure assessing adherence to prescribed home exercise. This scale is assessed via a 5-point Likert scale, the possible sum scores of which ranges from 0 to 24. Higher sum scores (0–24) indicate greater exercise adherence.[2]

The EARS scale has been translated into the Brazilian Portuguese,[12] Nepali and Japanese language.[14] To our knowledge, there is no validated scale for assessing adherence to prescribed exercises in Greek.

Therefore, the aim of this study was to adapt the EARS into Greek and evaluate its measurement properties in community-dwelling older adults.

MATERIAL AND METHOD

The present study was approved by the Ethical Committee of the University of Patras (13611/2022). Permission to start the cross-cultural adaptation procedure was obtained from the developers of the EARS questionnaire.

Participants

Written informed consent was obtained from all the older adults. Older adults were recruited from the local community and a private physiotherapy clinic, and were invited to participate in this study between January and July 2021.

The inclusion criteria were (a) being 60 years of age and older and (b) speaking Greek as the first language. The exclusion criteria were any disease or conditions like recent cognitive decline or surgery that could limit participants from doing exercises, and unwillingness to participate in the exercise programme. Prior to inclusion, participants were administered a Mini-Mental State Examination (MMSE), to assess their cognitive function and ensure orientation and cooperation.[15] Participants with dementia (MMSE score below 25) could not participate in this study.

Procedure

Cross-cultural adaptation of the EARS was done based on Beaton guidelines.[16] The research study was designed into two phases. The first phase consisted of the translation process and the second comprised the psychometric evaluation of the Greek version of the EARS (EARS-GR). The second phase included the psychometric evaluation of the questionnaire.

Phase 1: Translation. The translation process included five steps; forward translation, synthesis, back translation, expert committee review, and pre-testing. (a) The forward translation was conducted by two bilingual translators, whose native language was Greek. These translators independently translated the EARS from English into Greek. (b) The two forward translations were synthesized into one and the first version of the EARS-GR was produced. (c) This version was back translated into Greek by one bilingual translator. His native language was English and he was blinded to the original version of the EARS. (d) An expert committee reviewed the backward translation and compared the original questionnaire with the EARS-GR. The pre-final questionnaire of the Greek version was produced. (e) The pre-final version of the EARS-GR was administered to 10 older adults with variable educational levels. The older adults were asked whether they fully understood all questions and were asked to confirm the comprehensibility and syntax of all of them. Following this step, a final meeting was organized and the translators discussed the comments made by the older adults. This version was emailed back to the developer of the EARS for her approval. Thus, following these procedures the final version of the EARS-GR was developed.

Phase 2: Psychometric evaluation. Following the translation procedure, the questionnaire was evaluated for reliability, internal consistency and responsiveness. At the first session, the researcher/physiotherapist made the baseline assessment (self-report questionnaire and demographics) and the prescription of home exercise (motor control exercises). The individualized exercise programme was prescribed for 30 min per day for three days per week by a qualified physiotherapist. Adherence behavior was assessed after one week, and finally reassessed after two weeks (test-retest reliability).

Reliability

Reliability relates to the consistency of a measure.[17] Thirty-five older adults completed the final version of the questionnaire twice within seven days. The intraclass correlation coefficient (ICC) was used to test the reliability between the first and the retest overall score of the EARS. The Cronbach's alpha coefficient of the Greek version of the EARS questionnaire was 0.9, indicating a high level of internal consistency. Values of 0.70–0.95 are considered acceptable.[18]

Responsiveness

The responsiveness refers to the ability of an instrument to detect changes at two different time points, or the ability of an instrument to change relative to the change of a reference measure (external anchor).[19] Participants were contacted via telephone for responsiveness analysis, and the EARS was reapplied six weeks after the second assessment.

Minimum detectable changes

In addition, the minimum detectable change (MDC) at 95% of confidence interval (MDC 95%) and the standard error of measurement (SEM) based on the reliability of the scale and the standard deviation (SD) of the population were tested to evaluate the smallest change in score that reflects a true change in the adherence of exercise.[20]

Data analysis

Descriptive data (mean values, SD, etc.) has been utilized for the results. Test-retest reliability was tested using $ICC_{2,1}$. The two-way model single measure ($ICC_{2,1}$), and 95% confidence intervals were used to test the reliability between the first and the second administration of the EARS.

Reliability was considered poor, if ICC was 0.40, moderate between 0.40 and 0.75, substantial between 0.75 and 0.90, and excellent >0.90. Cronbach's alpha (α) was calculated to determine internal consistency. Cronbach's alpha level equal to or greater than 0.70 is considered satisfactory.[21] Two different statistics and standardized response mean were used to evaluate the responsiveness of the EARS-GR. Data were analyzed using the Statistical Package for Social Sciences (SPSS), version 25.0. The significant level was considered at $p<0.05$. In addition, the MDC 95% was assessed. The MDC 95% was computed according to formula: MDC 95%=1.96*SEM*√2.

RESULTS

A total of 35 older adults (24 women, 11 men; aged 72.45±6.4) participated in the study. Participants' characteristics are presented in table 1.

Translation

The translation procedure was performed without major difficulties. No problems were reported during the pilot study and thus, no further amendments of the questionnaire were required. The original developer verified the adaptation process and approved the final version of the EARS-GR.

Reliability

A total ICC of 0.93 (0.81–0.95) was found, indicating a good test-retest reliability of the EARS-GR after a 1-week interval (tab. 2).

Internal consistency

The internal consistency of the Greek version of the EARS was excellent (α=0.92) for a 6-item adherence behavior.[22]

Responsiveness

Responsiveness to change following the intervention was assessed using the responsiveness statistic (t test and standardized response mean [SRM]). The SRM was 0.3, moderate according to Cohen (tab. 3).[23]

Ability to detect changes

An MDC 95% of 1.94 points on the scale was yielded. SEM values are presented in table 4.

DISCUSSION

This is the first study to adapt the EARS into Greek and

Table 1. Participants' characteristics.

	Mean±SD
Age *(years)*	72.45±6.4
Comorbidities	4.17±1
EARS *(total score)*	18.51±3.44
1. I do my exercises as often as recommended	2.6±1.3
2. I forget to do my exercises	2.6±1.3
3. I do less exercise than recommended by my health care professional	2.6±1.3
4. I fit my exercises in to my regular routine	2.6±1.3
5. I don't get around to doing my exercises	2.6±1.3
6. I do most, or all, of my exercises	2.6±1.3
	Number and percentage (%)
Gender	
Male	11 (31.4%)
Female	24 (66.7%)

EARS: Exercise Adherence Rating Scale, SD: Standard deviation, N: Number

Table 2. Test-retest reliability of the EARS-GR (n=35).

	Test-retest reliability (ICC 2,1)
	ICC [2,1] 95% CI
Question 1	0.9 0.81–0.95
Question 2	0.97 0.95–0.98
Question 3	0.95 0.91–0.97
Question 4	0.89 0.79–0.94
Question 5	0.96 0.92–0.96
Question 6	0.91 0.82–0.95
Total score	0.9 0.81–0.95

EARS: Exercise Adherence Rating Scale, ICC: Intraclass correlation, CI: Confidence interval

Table 3. Responsiveness-standardised responsiveness mean results.

Mean score	SD	95% CI	T	P	SRM
0.31	0.99	0.02–0.65	1.82	0.07	0.31

95% CI: 95% confidence interval, SD: Standard deviation, SRM: Standardized responsiveness mean

Table 4. Minimum detectable change results.

	SEM/MDC
Question 1	0.7/1.94
Question 2	1.19/3.2
Question 3	1.1/3.04
Question 4	0.8/2.21
Question 5	0.9/2.49
Question 6	0.6/1.66
Total score	0.7/1.94

SEM: SD√1−ICC, MDC 95%: 1·96×SEM×√2

SEM: Standard of error measurement, MDC: Minimum detectable change

evaluate its measurement properties, in particular, reliability and responsiveness in community-dwelling older adults. The scale was initially developed in the United Kingdom as a patient reported outcome in order to assess exercise adherence in participants with chronic low back pain.[2] It has been cross-culturally adapted to several different populations. This scale has been cross-culturally adapted to Japanese in adults with various musculoskeletal disorders,[14] to Brazilian-Portuguese in people with non-specific chronic low back pain (LBP),[12] and the Nepali version has been developed in people with pre-diabetes or confirmed diagnosis of any disease.[13] The EARS may be applied to any patient who is prescribed home-based exercises by physiotherapists. In the current study, participants were community dwelling older adults, which were prescribed home based exercises for eight weeks.[13]

Literature shows that exercise is a very important factor influencing health status in older adults.[24] However, the benefits of exercise depend on continued participation[25] and older adults have to continue to do exercises.[26] Exercise adherence is a difficult problem for people of any age, but it is more challenging in older adults. The World Health Organization (WHO) has stated that health professionals must be trained in adherence and they need to develop means of accurately assessing adherence.[2,24] Therefore, for health professionals, a scale that could measure adherence seems important for clinical and research purposes. There is no gold standard for measuring adherence to prescribed home exercise. This study is important as it offers a valid and reliable measure of assessing adherence to prescribed exercise in the Greek clinical environment.[3]

Overall, the results showed satisfactory psychometric characteristics of the translated Greek version of the EARS questionnaire. The main findings demonstrated high levels of test-retest reliability in community-dwelling older adults. The test-retest reliability for the total score was 0.9 (91% CI: 0.81–0.95). The internal consistency of EARS-GR was excellent (α=0.92) for the 6-item adherence behavior[22] which is similar to the Brazilian version (0.94). Lower but acceptable results was internal consistency for 6-item adherence behavior for the English (Q=0.81),[3] Japanese (0.77),[14] and Nepali (0.88) version.[13]

In addition, the ability of a clinical tool to detect real changes in the patients' status and discriminate patients regarding their level of function, is important.[27] This ability (MDC) may be useful to physiotherapists in determining whether change during or after intervention is clinically significant.[28] In the current study, a MDC 95% of 1.94 points on the scale was yielded, which is less than the results of the Brazilian version (MIC: 5.5 in the EARS-Br total score). This difference could be associated with the population of interest in the current study and convenience sampling. Future studies using more robust sampling methods and wider populations aged >60 years with different disorders are required.[12]

Strengths and limitations

The present study had important clinical implications. Firstly, it was the first study to perform a thorough cross-cultural adaptation of the EARS into Greek. In addition, this cross-cultural adaptation was performed according to official guidelines (Beaton) and the researchers used standardized statistical measures.

However, this study also had some limitations. First, the study had a small sample size. Due to the COVID-19 pandemic, the data collection was stopped, and a preliminary analysis was done with the sample. In addition, validity was not measured in the current study. Future studies should measure validity of the EARS-GR.

In conclusion, the EARS has been successfully cross-culturally adapted to the Greek language. Psychometric evaluation showed that the EARS can be used for research and clinical measurements from Greek health professionals.

Further studies are recommended to investigate other psychometric properties of the Greek version of the EARS with a larger sample, including various age groups and different diseases.

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ΠΕΡΙΛΗΨΗ

Διαπολιτισμική διασκευή της κλίμακας Exercise Adherence Rating Scale σε Έλληνες ηλικιωμένους

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ΣΚΟΠΟΣ Η διαπολιτισμική διασκευή της κλίμακας Exercise Adherence Rating Scale (EARS) στην ελληνική γλώσσα και η αξιολόγηση των ψυχομετρικών χαρακτηριστικών αυτής σε περιπατητικούς ηλικιωμένους. **ΥΛΙΚΟ-ΜΕΘΟΔΟΣ** Τριάντα πέντε ηλικιωμένοι, ηλικίας 61–86 ετών (24 γυναίκες, 11 άνδρες, μέσος όρος ηλικίας: 72,45±6,4 έτη) συμμετείχαν στη μελέτη. Η δημιουργός της κλίμακας είχε δώσει άδεια για τη διασκευή. Η διαπολιτισμική διασκευή πραγματοποιήθηκε σύμφωνα με τις διεθνείς κατευθυντήριες οδηγίες κατά Beaton. Οι συμμετέχοντες εκπαιδεύτηκαν για εφαρμογή ασκήσεων κατ' οίκον και η συμμόρφωση αξιολογήθηκε μετά από μία εβδομάδα και επαναξιολογήθηκε μετά από δύο εβδομάδες (αξιοπιστία επαναληπτικών μετρήσεων). Έξι εβδομάδες μετά την πρώτη αξιολόγηση οι συμμετέχοντες προσκλήθηκαν να συμπληρώσουν την κλίμακα για τη διερεύνηση της ανταποκρισιμότητάς της. Ο δείκτης εσωτερικής συνέπειας και ο συντελεστής α του Cronbach εφαρμόστηκαν για την αξιολόγηση της αξιοπιστίας και της εσωτερικής συνάφειας. Η ελάχιστη ανιχνεύσιμη αλλαγή (MDC) χρησιμοποιήθηκε για την ποσοτικοποίηση της αποτελεσματικότητας της παρέμβασης. **ΑΠΟΤΕΛΕΣΜΑΤΑ** Η ελληνική έκδοση του EARS (EARS-GR) μεταφράστηκε χωρίς ιδιαίτερες δυσκολίες. Τα αποτελέσματα κατέγραψαν υψηλή εσωτερική συνοχή (Cronbach's α 0,92) και άριστη αξιοπιστία επαναληπτικών μετρήσεων (ICC=0,9, 95% διάστημα εμπιστοσύνης [CI]=0,81–0,95) για την κλίμακα των έξι πεδίων. **ΣΥΜΠΕΡΑΣΜΑΤΑ** Η κλίμακα EARS-GR διασκευάστηκε στα Ελληνικά, βρέθηκε αξιόπιστη και κατανοητή και μπορεί να χρησιμοποιηθεί τόσο για κλινικούς όσο και για ερευνητικούς σκοπούς. Προτείνονται μελλοντικές μελέτες για τη διερεύνηση άλλων ψυχομετρικών χαρακτηριστικών σε μεγαλύτερα δείγματα και διαφορετικές παθήσεις.

Λέξεις ευρετηρίου: Αξιοπιστία, Άσκηση, Διασκευή, Ηλικιωμένοι, Συμμόρφωση

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