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Original Article

The Psychometric Characteristics of the Exercise Benefits/Barriers Scale among Iranian Elderly

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Abstract

Background: The objective of this study was to investigate the validity and reliability of the Farsi version of the perceived benefits/barriers scale of physical activity in Iranian elderly.

Methods: Overall, 388 elderly subjects (60 yr and over) completed the demographic characteristics questionnaire, the Exercise Benefits/Barriers Scale (EBBS) and the Yale physical activity scale. Data were analyzed through of exploratory factor analysis, using Varimax rotation, Cronbach's alpha and Pearson correlation.

Results: The matrix table of rotated elements of Farsi version of EBBS showed ten components, and 41 items predicted 61.83% of variance. 28 items in 5 components for benefits of, and 13 items in 5 components for barriers to physical activity were identified. Cronbach's alpha for internal consistency in the whole scale and its subscales was 0.83, 0.94 and 0.68. In addition, positive and significant correlation was found between overall benefits and their subscales as well as between overall barriers and their subscales. Moreover, there was significant and positive correlation between physical activity and the benefits (r=0.209, *P*=0.005) and significant negative correlation between physical activity and the barriers (r=-0.231, *P*=0.001).

Conclusion: The results showed acceptable reliability and validity of the Farsi version of Exercise Benefits/Barriers Scale among Iranian elderly.

Keywords: Physical activity, Exercise, Benefits, Barriers, Aging

Introduction

Physical activity is defined as any bodily movement produced by skeletal muscles that require energy expenditure. "The energy expenditure can be measured in kilocalories. Physical activity in daily life can be categorized into occupational, sports, conditioning, household, or other activities" (1). In order to attempt to understand levels of physical activity among individuals, cognitive variables are particularly targeted, because they may be more amenable to change than less mutable variables (e.g. age, income) (2). Two specific cognitive variables, cited in the current research as accounting for physical activity levels are perceived benefits and perceived barriers. In Iran, sixty-two percent of Iranian elderly had laziness as the most important barrier toward engaging in physical activity (3). The evidence also indicated that more than 80% of the Iranian population is physically inactive (4). Given the low amount of physical activity among older adults, a standard-

ized, reliable and valid measurement of perceived benefits and barriers for this population is necessary. The most utilized a standardized measure of perceived benefits and perceived barriers for physical activity is the Exercise Benefits/Barriers Scale (EBBS). Based on preliminary research, Sechrist et al. showed that the EBBS has acceptable reliability and validity. In their study Cronbach's alpha coefficients was 0.95, 0.95 and 0.89 for whole scale, benefits and barriers subscales respectively (5). Others reported acceptable validity, reliability and factor structure of this scale among different populations (6, 7). In Iran, Aghamolaei et al. reported Cronbach's alpha coefficients as 0.87 for the whole scale in students (8), but they did not report any other psychometric characteristics of this scale such as factor structure and so on. Therefore, due to cultural, demographic and other significant variables, different results are obtained. Hence, this study aimed to test the psychometric characteristics (Reliability and validity) of the Farsi version of EBBS among Iranian elderly.

Materials and Methods

Study design

This was a cross-sectional and descriptive analytical study.

Study population

The study sample consisted of 388 elderly people (60 yr. and over) selected by cluster random sampling (66 females and 314 males; 302 subjects in 60–75 yr. and 78 subjects in 76-90 yr. age arrange. Eight others did not specify their age and gender. Individuals from different locations in northern and southern Tehran and different locations (such as parks, shopping centers, elderly care centers, homes, and recreational centers) were randomly selected.

Variables and measurements

For data, collection proposes three questionnaires were used:

1) A brief demographic information questionnaire including items such as age, gender, *marital status* etc.
2) The Yale Physical Activity Survey (YPAS) for rating physical activity among the elderly (9): this scale is a comprehensive scale that evaluates the type, amount and patterning of physical activity/exercise in older adults. The scale is divided into two sections: (a) amount of physical activity/exercise performed during a typical week in the past month and (b) activities performed in the past month. In section one, participants are handed a checklist of activity categories (work, exercise and recreational activities) and are asked how often during the past week they have performed a particular activity from each category (9, 10). In the first section, the time for each YPAS checklist activity is multiplied by an intensity code. The results are then summed up for all activities to create an energy expenditure summary index (kcal/wk.). In the second section, activities performed in the last month are calculated by multiplying a frequency score by a duration score for each of the five specified activities (vigorous, leisurely walking, moving, standing and sitting) and multiplying again by a weighting factor. Weights are calculated based on the relative intensity of the activity dimension. The final index is the sum of these indices.
3) The perceived benefits and perceived barriers of engaging in physical activity were assessed by the EBBS. A description of the measure and psychometric properties is outlined in the Introduction section of this paper. The respondent is asked to rate their agreement to perceived benefits and perceived barriers on a 4-point Likert scale (Strongly Agree to Strongly Disagree). The overall perceived-benefits score is calculated by summing up the 29 benefit items, with higher values indicating greater perceived benefits. An overall perceived-barriers score is also calculated by summing the 14 barriers items, with higher values indicating greater perceived barriers (5). International Quality of Life Assessment (IQOLA) method was used to translate the scale to Farsi. Hence, the scale was translated from English to Farsi by two linguists and re-

translated from Farsi to English to analysis of the semantic structures. Also, the expert's panel (consisting of five professors in physical activity and sport science and geriatric specialist) was asked to assess face and content validity.

Statistical analysis

Data were analyzed using Cronbach's alpha coefficients for reliability in terms of internal consistency, the Principle Component Analysis with Varimax rotation and Kaiser Normalization for exploratory factor analysis, and Pearson correlation coefficients for convergent construct validity (in terms of internal consistency). Data were analyzed by using SPSS (Version 18) in $P<0.05$. Based on statistical conventions, factors with Eigen values >1.0 were retained.

Results

Factor analysis of this study resulting from 43-item instrument yielded a 10-factor solution, which explained 61.83% of variance. When the 43 EBBS items were examined, 41 items were loaded exclusively on one single factor.

The content analysis of each factor was straightforward and proved valid (Table 1 and 2), yielding 5 factors in both benefits and barriers.

Table 1: Factor internal consistency and loadings of items from the benefits of EBBS

Item	Alpha	Loading value
Physical Performance	0.85	
7. Exercise increases my muscle strength.		0.824
15. Exercising increases my level of physical fitness		0.688
17. My muscle tone is improved with exercise.		0.777
18. Exercising improves functioning of my cardiovascular system.		0.571
22. Exercise increases my stamina.		0.881
23. Exercise improves my flexibility.		0.632
Psycho-Social	0.91	
8. Exercise gives me a sense of personal accomplishment.		0.480
10. Exercising makes me feel relaxed.		0.487
13. Exercising will keep me from having high blood pressure		0.455
20. I have improved feelings of wellbeing from exercise.		0.793
26. Exercising helps me sleep better at night.		0.433
27. I will live longer if I exercise.		0.505
29. Exercise helps me decrease fatigue.		0.696
32. Exercising improves my self-concept.		0.361
35. Exercise allows me to carry out normal activities without becoming tired.		0.474
36. Exercise improves the quality of my work.		0.624
38. Exercise is good entertainment for me.		0.381
39. Exercising increases my acceptance by others.		0.478
Body Characteristics	0.76	
31. My physical endurance is improved by exercising.		0.806
41. Exercise improves overall body functioning for me.		0.700
43. Exercise improves the way my body looks.		0.524
Psychological outlook	0.58	
1. I enjoy exercise.		0.590
2. Exercise decreases feelings of stress and tension for me.		0.784
3. Exercise improves my mental health.		0.434
Social Interaction	0.72	
11. Exercising lets me have contact with friends and persons I enjoy.		0.719
25. My disposition is improved with exercise.		0.449
30. Exercising is a good way for me to meet new people.		0.628
34. Exercising increases my mental alertness.		0.477

Only moderate or greater factor loadings (0.350 +) are included. / Overall EBBS Cronbach's $\alpha=0.83$

Besides, construct validity test (Internal consistency) test was performed by Pearson correlation of overall benefits and barriers with their subscales that was acceptable (ranging from 0.525 to 0.869, $P<0.01$).

Reliability in terms of internal consistency was good for all EBBS items (alphas=0.83), excellent for benefits items (alpha=0.94) and moderate for barriers items (alphas=0.68). Convergent construct validity of the EBBS with the YALE Physical activity scale by simple correlation revealed a significant positive correlation between physical activity rate (weekly kilocalories) and the perceived benefits subscale of the EBBS (r_s=0.209, P=0.005) and a significant negative correlation between physical activity rate (weekly kilocalories) and the perceived barriers subscale of the EBBS (r_s -0.231, P=0.001).

Table 2: Factor internal consistency and loadings of items from the barriers of EBBS

Item	Alpha	Loading value
Exercise Milieu	0.65	
12. I am too embarrassed to exercise.		0.664
14. It costs too much to exercise.		0.729
28. I think people in exercise clothes look funny.		0.701
Family Encouragement	0.77	
21. My spouse (or significant other) does not encourage exercising.		0.869
33. My family members do not encourage me to exercise.		0.814
Fatigue	0.72	
6. Exercise tires me.		0.816
19. I am fatigued by exercise.		0.844
Time Expenditure	0.60	
4. Exercising takes too much of my time.		0.429
24. Exercise takes too much time from family relationships.		0.865
37. Exercise takes too much time from my family responsibilities.		0.378
Facility Obstacles	0.50	
9. Places for me to exercise are too far away.		0.626
16. Exercise facilities do not have convenient schedules for me.		0.354
42. There are too few places for me to exercise.		0.827

Only moderate or greater factor loadings (0.350 +) are included.

Discussion

Overall, 41 items in 10 components predicted 61.83 percent of the variance. The findings of the current study are partly consistent with the research findings of Sechrist et al. (64.9% of the variance) (5). Six factors obtained in the present study were consistent with their study. Brown identified seven factors that predicted only 38.14% of the variance (6). Three factors obtained in the present study are consistent with the findings of Brown's study. Similarly, Ortabag et al have identified seven factors that predicted 57.16% of the variance as well (7). Hence, four factors obtained in the present study are consistent with the findings of Ortabag et al. The disparities among different studies can be attributed to several reasons: First, difference in the population or sample used. For instance, Sechrist et al. had used adults (5), while Brown had used students with high levels of physical activity, so that the 81.8% of them had reached recommended levels of physical activity (6). This led to a significant correlation between perceived benefits and physical activity, whereas there was not a significant correlation between barriers and physical activity. Ortabag et al had used nursing students and we used elderly people (7). The results have shown that the choice of populations influences the observed correlation between physical activity and perceived benefits and barriers of exercise, and that this issue can affect the factor structure of this scale.

The second reason for the similarity of the present study with that of Sechrist et al and its differences with Brown's study, is that in the present study and that conducted by Sechrist et al, Principal Component Analysis was used (5, 6), while Brown had used the Principal Axis Factorial Analysis (6). The Principal Axis Factorial Analysis approach is described as a more descriptive approach that incorporates shared variance among the variables.

In addition, results showed the EBBS reliability coefficient was 0.83, 0.94 and 0.68 for the total scale, benefits and barriers subscales respectively. These results of alpha's coefficient reflected sufficient internal consistency of the EBBS, consistent with Sechrist et al and Brown's studies (5, 6).

The present study indicated that the benefits and barriers scales accounted for a statistically significant proportion of the variance in physical activity, 4.3% ($r_{=}0.209$) and 5.3% ($r_{=}-0.231$) of the variance respectively. According to data obtained from previous research, these findings confirm the reliable correlation between benefits and barriers on the one hand and physical activity on the other. Brown's study (2005) indicated that only the benefits subscale accounted for a statistically significant proportion (only 4%) of the variance in physical activity (6).

Conclusion

The results showed that the Farsi version of the EBBS has acceptable reliability and validity among Iranian elderly, and can be used for this and other similar populations.

Ethical considerations

Ethical issues (Including plagiarism, Informed Consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

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