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

Ahmad Ali AKBARI KAMRANI 1, *Seyed Hojjat ZAMANI SANI 2, Zahra FATHIRE-ZAIE 2, Mahdi BASHIRI 3, Ebrahim AHMADI 2

1. Clinical Educational Group, University of Social Welfare and Rehabilitation Sciences, Iranian Research Center on Aging, Tehran, Iran
2. Dept. of Motor Behavior, University of Shahid Beheshti, Tehran, Iran.
3. Dept. of Sport Management, University of Tehran, Tehran, Iran

*Corresponding Author: Email: hojjatzamani8@gmail.com
(Received 09 Sep 2013; accepted 10 Jan 2014)

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, Sørensen 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.

| 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. Exercising 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 α=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=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=-0.231, P=0.001).

| 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% ($r^2 = 0.0209$) and 5.3% ($r^2 = 0.0231$) 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.

Acknowledgement

This study was supported by a grant from Iranian Research Center on Ageing of University of Social Welfare and Rehabilitation Sciences. The authors declare that there is no conflict of interests.

References

1. Caspersen CJ, Powell KE, Christenson GM (1985). Physical activity, exercise, and physical fitness: definitions and distinctions for health-related research. Public Health Rep, 100:126-131.
2. Buckworth J, Dishman RK (1999). Determinants of physical activity: research to application. In Rippe J (Ed). Lifestyle Medicine. Maiden, MA: Blackwell Science, 1016-1027.
3. Salehi I, Eftekhar H, Mohammad K, Taghdsi MH, Shojaeizadeh D (2010). Physical activity among a sample of Iranians aged over 60 years: an application of the transtheoretical model. Arch Iran Med, 13(6): 528-536.
4. Sheikholeslam R, Mohammad A, Mohammad K, Vaseghi S (2004). Non-communicable disease risk factors in Iran. Asia Pac J Clin Nutr, 13(suppl2): S100.
5. Sechrist KR, Walker SN, Pender NJ (1987). Development and psychometric evaluation of the Exercise Benefits/Barriers Scale. Res Nurs Health, 10: 357-365.
6. Brown SA (2005). Measuring perceived benefits and perceived barriers for physical activity. Am J Health Behav, 29(2): 107-116.
7. Ortabag T, Ceylan S, Akyuz A, Bebis H (2010). The validity and reliability of the exercise benefits/barriers scale for Turkish military nursing student. S Afr J Res Sport Phys Educ Recreation, 32(2): 55-70.
8. Aghamolaei T, Tavafyan, SS, Hasani, I (2009). Exercise Self-efficacy, Exercise Perceived Benefits and Barriers among Students in Hormozgan University of Medical Sciences. IJE, 4(3, 4): 9-15.
9. DiPietro L, Caspersen CJ, Ostfeld AM, Nadel ER (1993). A survey for assessing physical-activity among older adults. Med Sci Sports Exerc, 25(5): 628-642.
10. Young DR, Jee SH, Appel LJ (2001). A comparison of the Yale physical activity survey with other physical activity measures. Med Sci Sports Exerc, 33: 955-961.

Available at: http://ijph.tums.ac.ir