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Validity and reliability of the perceived benefits/ barriers scale of physical activity among Iranian elderly

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Abstract

Many studies showed physical activity improves health, especially in seniors. So, the aim of this research was the validity and reliability of the Persian version of perceived Exercise Benefits/Barriers Scale (EBBS) among elderly in Iran. In this study, 388 elderly completed scales including the benefits/ barriers scale of physical activity, the Yale Physical Activity Survey and demographic characteristics questionnaire. Data were analyzed by means of EFA, CFA, Correlation Coefficients, Cronbach Alpha and ANOVA in statistical programs of SPSS-18 and Amos-18. Results showed 10 components with 41 items predicted 61.83% of the variance. 28 items in five benefit factors and 13 items in five barrier factors were identified. Confirmatory factor analysis showed that the second order model of scale in the studied population was properly approved. Internal consistency of whole scale, benefits and barriers subscales was 0.83, 0.94 and 0.68 respectively. There was a significant positive relationship between benefit scale and its subscales and barriers scale and its subscales, ranged from 0.525 to 0.869. Results pointed to a positive and significant correlation between benefits and level of physical activity (r = 0.209), as well as, a negative and significant correlation between barriers and level of physical activity (r = -0.231). It is concluded that the Persian version of the EBBS has shown it to be an effective tool for measuring physical activity among Iranian elderly.

Keywords: Ageing, Physical activity, Reliability, Validity

Introduction

Leisure-time physical activity is a part of a healthy lifestyle, which has positive impacts on the health of different age-groups and the prevention of different diseases. In line with this, researchers have recommended that the elderly consume 1500 kcal weekly in physical activity [1]. Centers for Disease Control and Prevention (CDC) have suggested that all people do 30 minutes or more of physical activity with medium intensity in most days of the week, or better, throughout the entire week. The elderly who perform this level of physical activity experience the effective benefits of physical activity for their quality of life and health status. These studies have been conducted on men and women, showing positive impacts against different kinds of diseases, including blood pressure, type II diabetes, some cancers, osteoporosis, depression, heart disease, and musculoskeletal dysfunction. A study revealed that a slight increase in the level of physical

activity in the elderly has important general health benefits [2]. Despite these considerations and recommendations, the number of the elderly participating in leisure-time physical activity is low in different countries. Almost 58% of the elderly are inactive and sedentary, and only 29% of them exercise regularly, and only 10% follow the recommendations of the U.S. Center for Sports Medicine (ACSM) and the CDC for participation in low-to-medium intensity physical activities, which is at least 30 minutes of exercise [1].

The lack of suitable facilities for the leisure-time physical activity of the elderly denotes that a sedentary and inactive elderly lifestyle is a serious and pervasive problem. Social factors, expectations, inclinations, a limited access to exercise facilities and clubs, and different social and cultural gender roles can affect the level of physical activity of the elderly and reduce the likelihood of leisure-time exercise. A study showed the general understanding is that social norms encourage the elderly to be quiet, and officials deem the participation of the elderly in intensive physical activity less appropriate for them. In line with this, different ethnic cultures have a significant impact on the participation of the elderly in leisure-time physical activity. Societies with a lower education level and a medium-to-low socioeconomic status show a lower participation in physical activities. Also, in societies in which children perform less organized and purposeful exercise, and do less leisure-time physical activity, they will have a weaker performance and health status in their old age, as well [3,4], and in general, will receive less social support. All these factors can be effective in reducing the elderly's participation in leisure-time physical activity [5,6]. Nevertheless, few studies have explored the barriers to physical activity in the elderly, such that it can be claimed that no study has investigated this phenomenon systematically in Iran [7,8,9]. Definitely, an issue that has distracted experts and researchers from this field is the lack of the necessary instruments for examining it, and inadequate acquaintance with factors effective in this field. To this end, the present research attempts to examine the validity and reliability of one of the world's currently best tools in the field of benefits/barriers of physical activity, introducing it to the researchers of the filed in Iran. Making a questionnaire, Secherist et al. found its reliability and retest coefficients at 0.95 and 0.89, respectively [1]. Also Brown showed that the scale possessed a good and excellent internal consistency, respectively, for the barriers (0.81) and for the benefits (0.92) [11]. In addition, Ortabag et al. calculated suitable reliability and retest coefficients [12].

In their attempt to make the questionnaire, Secherist et al. [1], Brown [11], and Ortabag et al. [12], respectively, found 9 factors (64.9% of the explained variance), 7 factors (38.14% of the explained variance), and 7 factors (52.16% of the explained variance). In view of remarkable differences that might ensue from different study groups, and their social and cultural differences, the present research aims to assess the validity and reliability of the Persian version of the benefits/barriers scale of the physical activity in Iranian elderly. Due to the importance of the elderly as a vulnerable group of the society, and the special attention that is gradually being paid by different elderly-affiliated management and executive organizations to this group's physical, social, psychological, emotional, and economic problems, choosing a subject that assesses a part of this group's problems has always been among the most important health priorities. Another issue considered in choosing this subject was to address the problems of physical activity. Accordingly, the most reliable assessment tool for benefits and barriers of physical activity ever used in different countries and societies with different cultures was chosen. Of course, before using any instrument for assessing human factors, the validity and reliability of its translated version for that population should be evaluated. To this objective, and in order to contribute to the practical sources for the elderly, the validity and reliability of the benefits/barriers scale of physical activity were examined in this study.

Method

Regarding the target population and the research objectives, a random cluster sampling method was used in this study. This sampling method is used when all the members are not accessible [13]. To this end, people were questioned randomly in different places, such as parks, shopping centers, elderly caring centers, homes, and recreation centers.

A sample of 388 elderly was selected using the Morgan table. The volume of the selected sample was adequate based on the recommendations made about the number of cases required for an exploratory factor analysis [14].

The YALE Physical Activity Survey was used to study the level of physical activity in the elderly [15]. The perceived benefits/barriers of physical activity was measured with the Exercise Benefits/Barriers Scale (EBBS) [10]. This scale comprises 43 items, and studies the level of individuals' perception of benefits/ barriers of physical activity with a 4-point Likert scale (4= Strongly agree to 1= Strongly disagree). The scale was translated into Persian according to the translation guidelines of the International Quality of Life Assessment Protocol (IQOLA) as follows:

"Initially, two native Persian translators with a good command of English translation (translators 1&2) translated the English version of the test into Persian. The two translators were also asked to provide, if required, a list of possible alternative translations for some terms, phrases or sentences of the scale. In this stage, the emphasis was laid upon the conceptual equivalence of terms, phrases and sentences of the test (a literal translation). Each translator, then, scored all items of the test on a visual 100-point scale in terms of the difficulty of their translation, such that scores 0 and 100 meant a quite easy and an extremely difficult translation, respectively.

In the second stage, translators 1&2 along with the researchers of the present study held meetings, discussing the translated versions; taking into account the difficult parts of the translation and suggested alternative terms, they finally agreed on a jointly translated Persian version of the text. It is noteworthy that to resolve the differences about the extent of the difficulty of the translation in this stage, translated texts with the mean difficulty point of below 25, 25-30, and over 30 were considered, respectively, as a simple, fairly simple, and difficult translation.

The Persian version was presented to two other translators (translators 3 & 4), who were native Persian speakers with a full command of Persian and English. They scored the quality of the translation of all items of the Persian version presented to them. In this stage, a good translation quality referred to the clarity of the phrases and sentences (using simple and comprehensible terms), using a common language (avoiding technical, specialized and artificial terms), conceptual similarity (conveying the conceptual content of the main version of the scale), and the general quality of the translation. Accordingly, translators 3 & 4, scored 4 points for each item of the Persian version on a 100-point scale (appendixes 6 to 9). On this visual scale, the zero showed a fully unacceptable, and 100 showed a fully satisfying and desirable translation quality.

The criterion for an undesirable translation quality was the mean quality point of under 90 (determined by translators 3 & 4), according to which some Persian items in this stage were identified as badly translated. Alternative phrases and sentences suggested by translators 3 & 4 or the researchers were used for these terms, and the translation quality was again measured. This process continued to improve the translation quality until we achieved a desirable, or at least, a relatively desirable quality (the mean point 80-90); and thus, a Persian version with a desirable quality from the point of view translators 1 to 4 was achieved.

In the last stage, another translator (translator 5) with an adequate command of Persian-English translation was asked to perform a backward translation of the Persian version. The English versions of this translator were discussed in various sessions held by the researchers of the present study, leading

finally to an agreement on an English joint translation, which was then compared with the original English benefits/barriers scale of physical activity in terms of conceptual similarity in sessions with the researchers and translators 3 & 4. The conceptual similarity was confirmed after removing some trivial deficiencies. Following the above stages, we could finally achieve a Persian version of the benefits/barriers test of physical activity with a desirable and satisfactory translation quality, which was used to collect data in the research's later stages."

It is noteworthy that the formal and content validity of the scale has been examined and confirmed by Secherist et al. [10] during the construction phase. Also, in this study, five specialists in the field of physical education and exercise sciences, as well as, specialists in geriatric medicine reached a comprehensive view in their examination of the scale's themes, their comprehensiveness, and their similarity in the studied subject. The scale did not undergo a significant change in this stage.

All subjects signed informed consent. Also, the personal information of the participants presented to the researcher was kept confidential. The participants were also free to withdraw from the research project at any stage and for any reason.

The data were summarized for quantitative and qualitative variables, respectively, based on the mean (standard deviation) and frequency (percentage). An exploratory factor analysis and a principle component analysis with a Varimax rotation were used to determine the construct validity; also, the Kaiser-Meyer- Olkin Measure of Sampling and the Bartlett's Test of Sphericity were employed to examine the factor analysis capability (as a scale for assessing the capability for becoming factor, such that KMO= 0.5 meant a weak, and KMO=0.6 meant an acceptable capability, and the closer the KMO value to 1, the better). A Varimax rotation was used to determine the basic structure of the scale, the Cronbach's alpha coefficient was used to determine the internal consistency of the scale and its subscales, a one-way ANOVA test and the Bonferroni post-hoc test were used for examining the discriminant validity of the level of physical activity in different groups, and the Pearson's correlation coefficient was used for examining the convergent validity between the scale of the elderly's physical activity and the EBBS. The data were analyzed with the software programs of SPSS-18 (PASW Statistics for Windows Chicago: SPSS Inc) and AMOS-18 (United States: Amos Development Corporation) at the significance level of $P<0.05$.

Results

Factor analysis capability indexes confirmed that we can use the exploratory factor analysis (The value of Kaiser-Meyer-Olkin= 0.846, Bartlett's Sphericity test, chi-square value= 6650.06, P= 0.0005, df= 903). The results presented in table 1 indicate that all required assumptions related to using the factor analysis method have been observed, and in fact, they have exceeded the specified limit. Generally, the table of rotation matrix elements showed that 10 items with a value greater than 1 had the capability of becoming factor. These 10 items predict, in total, 61.83% of the variance, which were suggested based on the pattern of factor loadings (table 1).

The Cronbach's alpha coefficient was used to check the reliability (the internal consistency). The Cronbach's alpha coefficient of the total questionnaire was calculated at 0.83. Table 2 presents factors, items, the factor loading

Table 1 *The Variance Explained by Various Factors*

Factor	Total (Eigen Value)	Explained Variance (%)	The cumulative explained variance (%)
1	5.23	12.16	12.16
2	4.42	10.28	22.44
3	2.66	6.18	28.62
4	2.54	5.90	34.52
5	2.42	5.62	46.87
6	2.01	4.69	44.83
7	1.98	4.60	49.43
8	1.97	4.60	54.02
9	1.89	4.39	58.42
10	1.47	3.41	61.83

Table 2 *The items related to the factors of the benefits/barriers scale of physical activity, along with each item's factor loading and its extent of internal consistency*

Factor	Items	The Level of Factor Loading	Cronbach
The Improvement of Psychological and Social Factors	8- Physical activity gives me a sense of personal achievement.	0.480	0.91
	10- Physical activity relaxes me.	0.487	
	13- Physical activity can save me from high blood pressure.	0.554	
	20- Physical activity improves my feeling of well-being.	0.793	
	26- Physical activity helps me sleep better at night.	0.433	
	27- Physical activity helps me live longer.	0.505	
	29- Physical activity helps me reduce fatigue.	0.696	
	32- Physical activity improves my self-concept.	0.361	
	35- Physical activity lets me do my regular work without fatigue.	0.474	
	36- Physical activity improves the quality of my work.	0.624	
	38- Physical activity is a good amusement for me.	0.381	
	39- Physical activity facilitates my acceptance of others.	0.478	
The Improvement of Mobility Performance	7- Physical activity improves my muscle strength.	0.824	
	15- Physical activity improves the level of my physical fitness.	0.688	
	17- Physical activity increases the power of my muscles.	0.777	0.85
	18- Physical activity improves my cardiovascular function.	0.571	
	22- Physical activity boosts my stamina.	0.881	
	23- Physical activity improves my flexibility.	0.632	
The Lack of Family Encouragement	21- My spouse (or any other important person) does not encourage me to do physical activity.	0.869	0.77
	33- My family members do not encourage me to do physical activity.	0.814	
The Improvement of Physical Characteristics	31- Physical activity improves my physical endurance.	0.806	0.76
	41- Physical activity increases my overall physical efficiency.	0.700	
	43- Physical activity improves the way I look.	0.524	
The Improvement of Social Interaction	11- Physical activity lets me meet friends and people I enjoy.	0.719	0.72
	25- Physical activity increases my discipline and tidiness.	0.449	
	30- Physical activity is a good way to meet new people.	0.628	
	34- Physical activity improves my alertness.	0.477	
Physical Fatigue	6- Physical activity makes me tired.	0.816	0.72
	19- I become tired with physical activity.	0.844	
The Environment for Physical Activity	12- Physical activity makes me shy.	0.664	0.65
	14- Physical activity is expensive.	0.729	
	28- People with sport suits seem funny.	0.701	
The time-consuming-ness of Physical Activity	4- Physical activity takes a lot of my time.	0.419	0.60
	24- Physical activity takes a lot of my Family time.	0.865	
	37- Physical activity takes a lot of the time that should be spent on my family duties and responsibilities.	0.378	
The Improvement of Psychological Factors	1- I like physical activity.	0.590	0.58
	2- Physical activity eases my feeling of stress and tension.	0.784	
	3- Physical activity improves my psychological health.	0.434	
Facility and Equipment Barriers	9- Physical activity places are too far from me.	0.626	0.50
	10- Physical activity equipment is not suitable and accessible.	0.354	
	42- There are very few exercise places.	0.827	
Total Barriers	-		0.68
Total Benefits	-		0.94

Because the sample consisted of more than 350 members, we were allowed in this study to choose factor loading of greater than (+0.300); however, the factor loadings of higher than (+0.350) were selected in this research (Tabachanic & Fidel: 2007).

of each item, and the extent of the internal consistency of each item.

The relationship between the score and the subscales of the benefits of physical activity, as well as, the relationship between the overall score and the subscales of the barriers to physical activity were assessed. A range of correlation coefficient between 0.525-0.869 at the significance level of P<0.01 was obtained (The Improvement of Mobility Performance: 0.807, the Improvement of Psychological and Social Factors: 0.769, The Improvement of Physical Characteristics: 0.830, the Improvement of Social Interaction: 0.819, the Improvement of Psychological Factors: 0.641, The Environment for Physical Activity: 0.633, the Lack of Family Encouragement: 0.544, Physical Fatigue:0.634, the time-consuming-ness of Physical Activity: 0.525, and Facility and Equipment Barriers: 0.544). The observed correlation denotes that an acceptable internal consistency exists between subscales and the entire test. In the next section, the correlation between the level of physical activity and its benefits and barriers was examined in order to check the convergent validity, which showed a significant and acceptable correlation between the level and the benefits/barriers of physical activity [regarding the benefits (r= 0.209, p= 0.005), and barriers (r= -0.231, p= 0.001)]. Also, the differences between physical activity groups were examined to check the discriminant validity. To this end, as table 3 shows, the mean and the standard deviation of the benefits/barriers of physical activity were classified into the three groups of low, medium, and high intensity. This classification was conducted on the basis of the level of physical activity drawn from the Yale Physical Activity Survey in a population of older adults. The results of the one-way ANOVA analysis pointed to a significant difference between the different groups of physical activity in terms of the benefits/barriers of physical activity. The Bonferroni post-hoc test also showed the location of the differences (Table 4). Regarding the barriers to physical activity, the group with a high level of physical activity, compared with the group with a medium level, had perceived fewer barriers. There was also a significant difference between the groups with medium and low levels of physical activity, such that the latter also had perceived fewer barriers. Regarding the benefits of physical activity, the group with a high level of physical activity, compared with the group with a low level of physical activity, had perceived more benefits.

The confirmatory factor analysis showed that the parameter estimation results of all ten factors and the relevant items had a significant relationship, such that the domain of the relations was between 0.234-0.866.

Table 3 *The comparison between the benefits/barriers of physical activity in different groups of physical activity*

	Physical Activity Group	**Number**	**Mean***	**SD** (±)	**P-value** (Variance Analysis)	**P-value** (The Bonferroni post-hoc test)
The Barriers to Physical Activity	Low Intensity	73	2.041	0.341	0.0001	Low and Medium (0.012)
	Medium Intensity	70	2.207	0.470		Medium and High (0.0001)
	High Intensity	65	1.949	0.355		
The Benefits of Physical Activity	Low Intensity	61	3.555	0.413	0.008	Low and High (0.01)
	Medium Intensity	57	3.594	0.330		
	High Intensity	63	3.631	0.348		

*The maximum score is four, and the minimum score is one.

Also, the two factors (barriers and benefits) had a significant relation with 10 sub-factors at 0.409-0.913. Therefore, based on a structural equation model (a second-order confirmatory factor analysis) and according to the T-values and the significance level, all assumed variables were capable of predicting their own factors (Tables 4).

Table 4 *The estimated values of the standard deviation, t and the significance level parameters in 10 sub-factors with 41 sub-factors of the benefits/barriers scale*

	Items/Subscale	Estimated Values	±SD	T	P-value
The Improvement of Mobility Performance	7	1.000			
	15	1.69	0.098	10.880	0.0001
	17	1.182	0.101	8.534	0.0001
	18	0.980	0.115	8.534	0.0001
	22	1.088	0.098	11.125	0.0001
	23	1.259	0.128	9.856	0.0001
The Improvement of Psychological and Social Factors	8	1.000			
	10	0.781	0.085	9.188	0.0001
	13	0.894	0.106	8.470	0.0001
	20	0.993	0.120	8.263	0.0001
	26	1.013	0.097	10.444	0.0001
	27	0.979	0.108	9.070	0.0001
	29	0.961	0.118	9.800	0.0001
	32	0.969	0.009	10.537	0.0001
	35	1.154	0.110	9.504	0.0001
	36	1.021	0.107	9.251	0.0001
	38	0.946	0.102	10.002	0.0001
	39	1.130	0.113		0.0001
The Improvement of Physical Characteristics	31	1.000			
	41	1.015	0.100	10.455	0.0001
	43	1.028	0.098	6.001	0.0001
The Improvement of Psychological Factors	1	0.716	0.119	7.910	0.0001
	2	1.166	0.147		0.0001
	3	1.000			
The Improvement of Social Interaction	11	0.735	0.123	7.972	0.0001
	25	0.910	0.114	7.972	0.0001
	30	0.841	0.106	7.914	0.0001
The Environment for Physical Activity	34	1.000			
	12	1.318	0.233	5.653	0.0001
	14	1.770	0.309	5.732	0.0001
The Lack of Family Encouragement	28	1.000			
	21	0.540	0.165	3.283	0.001
	33	1.000			
Physical Fatigue	6	1.151	0.226	5.084	0.0001
The time-consuming-ness of Physical Activity	19	1.000			
	4	0.595	0.142	4.197	0.0001
	24	0.752	0.119	6.331	0.0001
Facility and Equipment Barriers	9	2.268	0.793	2.862	0.004
	16	3.617	1.488	2.431	0.015
	42	1.000			
The Benefits of Physical Activity	The Improvement of Mobility Performance	1.000			
	The Improvement of Psychological and Social Factors	1.388	0.159	8.743	0.0001
	The Improvement of Physical Characteristics	1.160	0.134	8.638	0.0001
	The Improvement of Psychological Factors	0.781	0.119	6.566	0.0001
	The Improvement of Social Interaction	1.268	0.154	8.225	0.00001
The Barriers to Physical Activity	The Environment for Physical Activity	1.000			
	The Lack of Family Encouragement	1.105	0.257	4.304	0.0001
	Physical Fatigue	0.842	0.245	3.441	0.0001
	The time-consuming-ness of Physical Activity	1.398	0.284	4.915	0.0001
	Facility and Equipment Barriers	0.228	0.103	2.208	0.027

The confirmatory factor analysis model was performed with the Amos software package to confirm the factors drawn from the benefits/ barriers scale of physical activity. The

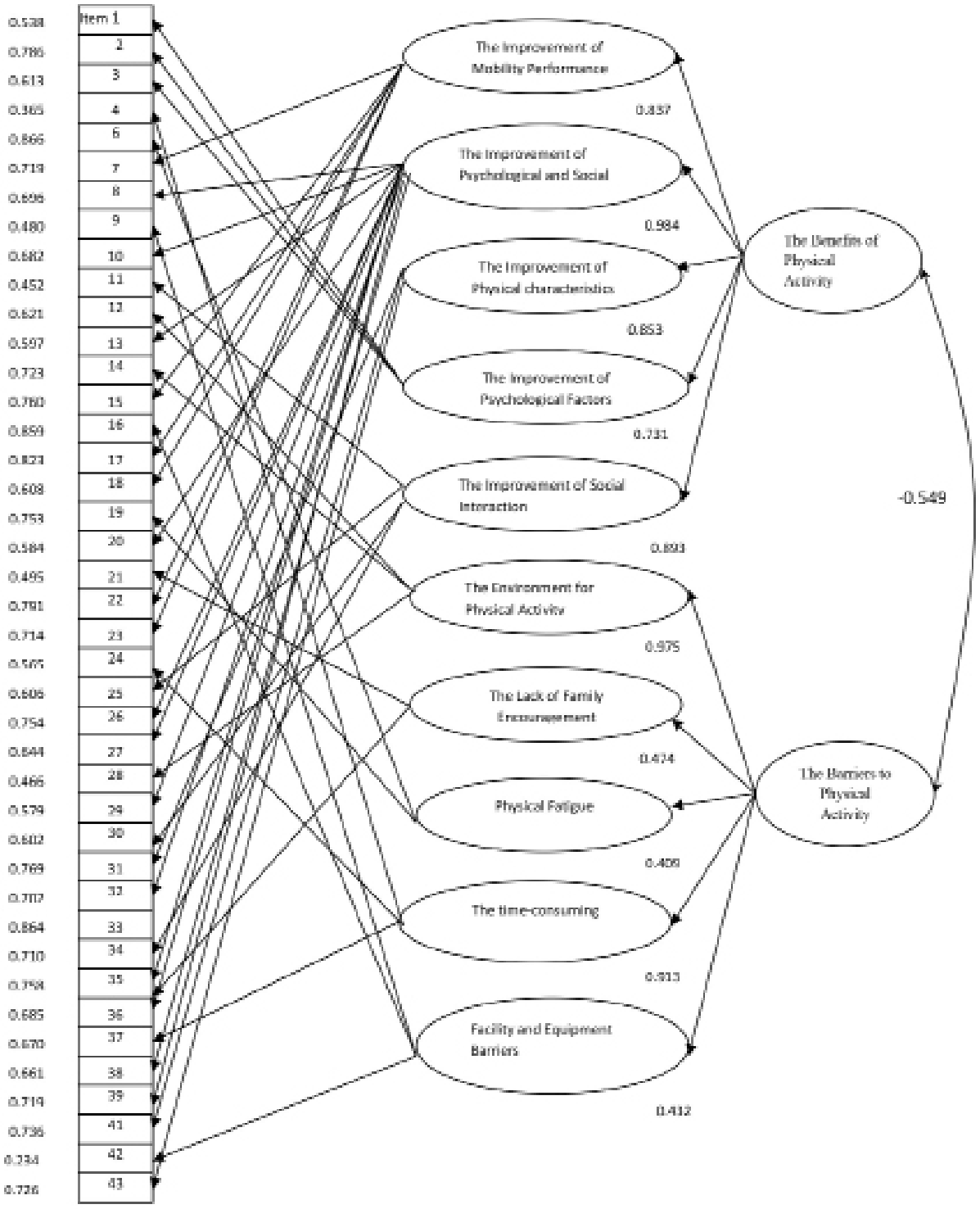

Figure 1 *The theoretical model of the benefits/barriers scale of physical activity with the factor loading of each sub-factors and items*

features obtained from this method, including the estimated standardized coefficients, T-values, the significance level, and the model fitness indicators based on some measures such as Chi-square, Chi-square: degrees of freedom ratio, the goodness of fitness indexes (GFI), the adjusted goodness of fitness indexes (AGFI), comparative fitness indexes (CFI), RMSEA, etc., were calculated and are presented in table 5. The results of

this model (table 5) indicate that the indexes of the second-order factor analysis model fit well with the 10 sub-factors: The Improvement of Mobility Performance, The Improvement of Psychological and Social Factors, The Improvement of Physical Characteristics, The Improvement of Psychological Factors, The Improvement of Social Interaction, The Environment for Physical Activity, The Lack of Family Encouragement, Physical Fatigue, The time-consuming-ness of Physical Activity, and Facility and Equipment Barriers. Chi-square values relative to the degrees of freedom equal to 1.825, the square root of the Residual Mean Square (RMS) equal to 0.021, the comparative fitness index close to 0.90, the thrifty indexes (PNFI, PCFI) greater than 0.50, and the RMSEA index equal to 0.05, all confirm the conclusion that the compiled model is, to a large extent, acceptable.

Table 5 *The values of the fitness indexes of the scale's confirmatory factor analysis model*

Fitness Indexes	Chi-square relative to the degrees of freedom	RMS	CFI	RM-SEA	PCFI	PNFI
Model	1.825	0.021	0.88	0.05	0.790	0.663

Discussion: The aim of the present research was to examine the validity and reliability of the Persian version of the perceived benefits/barriers scale of physical activity in the elderly. The results of the study showed that this scale enjoyed an acceptable exploratory factor structure. This questionnaire, with the KMO scale equal to 0.846 as a scale for assessing the capacity for becoming factor, enjoyed this capacity. The Bartlett's scale of Sphericity also showed that the correlation matrix of the data is not zero for the population; therefore, the search for factors has been justifiable. These two examinations showed that the main assumptions of exploratory factor structure existed in this questionnaire. The table of rotation matrix elements showed that 10 components had the capacity for becoming factor, and generally, 41 items predict 61.83% of the variance. 28 items in 5 factors of the benefits of physical activity, and 13 items in 5 factors of the barriers to physical activity were identified. These factors in the field of the benefits of physical activity were titled "the improvement of mobility performance, the improvement of psychological and social factors, the improvement of physical characteristics, the improvement of psychological factors, the improvement of social interaction", and in the field of the barriers to physical activity "the environment for physical activity, the lack of family encouragement, physical fatigue, the time-consuming-ness of physical activity, and facility and equipment barriers". The findings of this research were, to some extent, consistent with the findings of a research by Secherist et al. [10]. In making a questionnaire, they also showed that it included 10 subscales, which explained 64.9% of the variance. The explained variance in our study is quite close to the research by Secherist et al. [10], despite their differences regarding the factors. Six factors obtained in our study were in harmony with the factors achieved during the construction of the scale.

Brown [11] also identified 7 factors, predicting only 38.14% of the variance, which conformed with 3 factors obtained in the present study. Ortabag et al. [12] showed that the questionnaire had 7 factors, which predicted 57.16% of the variance, according with 4 factors of the present research. The inconsistencies between the studies can be summarized as follows. Firstly, different social categories have been explored in these studies, such that Secherist et al. [10] studied adults, Brown et al. university students, Ortabag et al. [12] nursing students, and the present research studied the elderly. The results of different studies have shown that the relationship between the level of physical activity and the perceived benefits/barriers of physical activity varies in different social categories, which can affect the factor structure of this questionnaire. Brown had studied university students with a high level of physical activity, such that 81.8% of them had achieved the recommended levels

of physical activity, causing a significant relationship between the perceived benefits of physical activity, unlike its barriers, with the level of physical activity in his study.

The second reason for the similarity of the present study with the research conducted by Secherist et al., and for its difference with the study by Brown might lie in the fact that the present study, as well as the study by Secherist et al., has used the analysis of the principal components as the exploratory factor analysis method; whereas Brown has used the analysis of the main central factors. The principal component analysis method is a common practical method, which is used to reduce the amount of information on a variety of factors, analyzing the total variance of each variable while the main central factor analysis is more a theoretical method, analyzing only the shared variance [11].

Also, in this study, some items in two components showed a high factor loading, which is justifiable in view of the proximity of some factors to each other; for instance, item 10 (physical activity relaxes me) had an acceptable factor loading in both the second (the improvement of psychological and social factors) and the 8th factor (the improvement of psychological factors). Nevertheless, a higher factor loading was taken into account in all cases. This issue was also observed in making the questionnaire by Secherist et al. [10], such that their 5 items were also loaded in two factors.

The results of the present study showed that the translated scale of the benefits/barriers of physical activity enjoyed an acceptable internal consistency, both generally and in the subscales of the benefits/barriers (with the Cronbach's alpha of, respectively, 0.83, 0.94, and 0.68). Also, in some subscales, the internal consistency was at a medium (0.50) and higher level, and for some others, it was at an acceptable level (0.70 and above). The results of this study were consistent with those of previous studies. Brown [11] showed that the scale of the benefits/barriers of physical activity enjoyed a good internal consistency (0.81) in general and in the subscale of the benefits, and an excellent internal consistency (0.92) in the subscale of the barriers. In their study, the two factors of physical fatigue and facility barriers showed a medium level of internal consistency, that is, 0.68 and 0.67, respectively. Secherist et al. [10] also reported a good internal consistency for the scale, showing that the entire scale, and the benefit and barrier subscales had the Cronbach's alpha of, respectively, 0.95, 0.95, and 0.86. Ortabag et al. [12] also reported the Cronbach's alpha of 0.87, 0.95, and 0.80, respectively, for the entire scale, and for the benefit and barrier subscales. They also reported the Cronbach's alpha of 0.64, 0.95, and 0.69, respectively, for the two factors of “the environment for physical activity” and “preventive health”. Also in their study a significant positive correlation was found between the benefits of physical activity, in general, and its subscales, as well as, between the barriers to physical activity, in general, and its subscales, proving that these questions had assessed a single subject.

The results of the research showed a significant positive correlation between the benefits of physical activity, in general, and the level of physical activity in the elderly ($r=0.209$, $p<0.05$), and a significant negative correlation between the barriers to physical activity, in general, and the level of physical activity in the elderly ($r = -0.231$, $p<0.01$); however, the correlation between the barriers and the level of physical activity was higher and stronger. These results accord with the results of Brown’s study [11] regarding the correlation between the benefits and the level of physical activity, but differing regarding the barriers to physical activity. Brown found out a significant positive correlation between the benefits and the level of physical activity, but not reporting a relationship between the barriers and the level of physical activity. According to the existing models of health behavior change, such as the health belief model, the perception of the barriers to physical activity is contrary to that of the benefits of physical activity. Also, according

to the health action process approach, a higher perception of the benefits of physical activity is associated with a higher level of physical activity, and conversely, a higher perception of the barriers to physical activity is associated with a lower level of physical activity [16]. This hypothesis was also confirmed in this research; nevertheless, Brown explains the lack of correlation between the barriers and level of physical activity in their study in terms of the subjects of their study, who did physical activity far more than did regular people. Also, as their study had been conducted on university students, some items of the questionnaire might have not been fitting well with the features of the student community, which is not unexpected [11]. The results of the research also showed that a significant difference between the low and medium level physical activity groups, as well as, between the medium and high level physical activity groups in the barriers to physical activity. Also, a significant difference held between the low and high level physical activity groups in the benefits of physical activity, such that the more active people had perceived more benefits, and the medium level physical activity group, compared with the high level group, had perceived more barriers. The current research results are similar to some, and different from some others, results achieved by Ortabag et al. [12]. They showed that a significant difference in the benefits/barriers of physical activity held between those who did and those who did not do physical activity, such that active people, compared with the inactive, had a higher and a lower perception of the benefits and barriers of physical activity, respectively. The existing discrepancies might be due to the categorization method of the level of physical activity. In this study, we classified the subjects into the three groups of low, medium and high physical activity; whereas Ortabag et al. [12]had classified the people into the two groups of active and inactive, which shows the categorization had been completely different in the two studies.

Conclusion

As several studies have examined the validity and reliability of this questionnaire in different societies, and have produced different results, it is recommended that the questionnaire components and factors be studied and analyzed in different groups of the society in order to use it more efficiently at a wider scale. The present study explored the questionnaire components and yielded acceptable results. Therefore, the examined questionnaire of this research can be used in populations similar to its statistical sample and population, such as Tehran's elderly who visit parks, shopping centers, homes, and recreation centers or reside in elderly caring centers. However, the maximum use of this questionnaire requires its further examination in different social groups in order to study the benefits/barriers of physical activity from their points of view, and to plan future programs for changing the physical activity behaviors of different social groups. Also, participants were included in this research who volunteered to complete the questionnaire, and those who were reluctant were free not to do so. As often is the case, those who are active in a particular area are inclined to share information about that area; based on this, it seemed in this research that those with a previous good and relatively good attitude towards physical activity participated in this study. Although the attitude toward practical activity was not closely assessed in this research, it could be a limitation of this study.

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Contributions

Study design: SHZS, AAAK
Data collection and analysis: SHZS, ZFR, MB, EA
Manuscript preparation: SHZS, AAAK, ZFR

Conflict of interest

"The authors declare that they have no competing interests."

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