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ORIGINAL ARTICLE

Reliability and validity of the Turkish version of the Physical Activity Barrier Scale for people who are blind or visually impaired

Kör veya görme engelli bireyler için Fiziksel Aktivite Bariyer Skalası'nın Türkçe versiyonunun güvenirliği ve geçerliği

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Abstract

Purpose: The aim of this study was to investigate the validity and reliability of the Turkish version of the Physical Activity Barrier Scale (PABS) for visually impaired individuals.

Methods: People with visually impaired, low vision (n=53) and blind people (n=84), a total of 137, were participated in the present study. The physical activity barriers of the participants were evaluated with the PABS. The International Physical Activity Questionnaire (IPAQ-Long Form) was used to determine the physical activity level of the participants. Internal consistency was determined by using Cronbach's alpha and test-retest reliability was determined by using the intra-class correlation coefficient (ICC).

Results: The mean age of the participants was 43.03±13.75 years and the mean body mass index was 26.11±4.77 kg/m^2. Cronbach's alpha for the PABS was 0.933 for the test and 0.894 for the re-test measurements. The test-retest ICC values of the PABS varied between 0.563 and 0.950. The mean physical activity level of the participants was found as 4049.43±4956.59 METXminutes/week. There was no statistically significant correlation between the total scores of the PABS and the IPAQ (p>0.05).

Conclusion: There is currently no specific questionnaire regarding physical activity and its barriers for visually impaired individuals in Turkey. The study showed the reliability of the Turkish version of the PABS for individuals with visual impairment.

Keywords: Exercise, Physical activity, Reliability and validity, Visually impaired people.

Öz

Amaç: *Çalışmamızın amacı, görme engelli bireylere yönelik Fiziksel Aktivite Bariyer Skalası (FABS)'nın Türkçe versiyonunun geçerlik ve güvenirliğinin araştırılmasıdır.*

Yöntem: *Çalışmamız az gören (n=53) ve kör (n=84) bireyler olmak üzere toplam 137 katılımcıdan oluşmaktaydı. Fiziksel aktivite bariyerleri FABS kullanılarak değerlendirildi. Uluslararası Fiziksel Aktivite Anketi (IPAQ-Uzun Form) katılımcıların fiziksel aktivite düzeyini belirlemek amacıyla kullanıldı. Cronbach's alpha kullanılarak iç tutarlılık, sınıf içi korelasyon katsayısı (ICC) kullanılarak test-retest güvenirliği belirlendi.*

Bulgular: *Katılımcıların ortalama yaşları 43,03±13,75 yıl, ortalama vücut kütle indeksleri ise 26,11 ± 4,77 kg/m^2'ydi. FABS'ın Cronbach's alpha değerleri test ölçümlerinde 0,933, re-test ölçümlerinde ise 0,894'tü. Katılımcıların ortalama fiziksel aktivite seviyesinin 4049.43±4956.59 METXdakika/hafta olduğu bulundu. FABS'ın test-retest ICC değerleri 0,563 ile 0,950 arasında değişti. FABS ile IPAQ toplam puanları arasında anlamlı bir korelasyon yoktu (p>0,05).*

Sonuç: *Türkiye'de görme engelli bireylerin fiziksel aktivite ve bariyerleri ile ilgili spesifik bir anket bulunmamaktadır. Bu çalışma görme engelli bireyler için FABS'ın Türkçe versiyonunun güvenirlir olduğunu gösterdi.*

Anahtar kelimeler: *Egzersiz, Fiziksel aktivite, Güvenirlik ve geçerlik, Görme engelli bireyler.*

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INTRODUCTION

Visual impairment consists of blindness and low vision. Blindness refers to the complete loss of vision and no perception or projection of light. Low vision, on the other hand, is a visual functional impairment that continues after standard refractive corrections, and a visual acuity of less than 20/60 while still retaining the capacity to plan and perform a task.[1-3] When visually impaired individuals have a loss of vision from birth, their motor development may be delayed. Having problems in reaching and finding objects during activities, difficulty in bringing the hands to the midline due to coordination deficiency and a defect on visual stimuli during mobilization may result in activity limitations.[4,5] Indeed, children and adolescents with visual impairments have low physical activity levels.[6]

Physical activity refers to any movement produced by skeletal muscles that requires energy consumption.[7] The 2013 AHA/ACC/TOS guidelines for the management of weight and obesity in adults recommend to perform physical activity of ≥150 minutes per week.[8]

According to the World Health Organization's International Classification of Functioning, Disability and Health (ICF), the physical functions and physical activity habits of individuals with disabilities are significantly affected by environmental and personal factors, which may act as either facilitators or barriers.[9]

Longmuir and Bar-Or showed that the physical fitness levels of visually impaired individuals were lower than controls.[10] Moreover, they also reported that visually impaired young people are one of the most sedentary groups among other disability groups. It has been predicted that mobilization will be adversely affected as a result of visual impairment.[10,11]

Visually impaired individuals may be unable to participate in physical activities due to personal limitations resulting from general muscle weakness, tightness of muscles and impaired balance.[5] Other barriers for the participation in physical activities may include environmental limitations, such as the lack of physical activity spaces accompanied by professionals and the lack of proper or suitable equipment, halls, or pools suited to people with disabilities.[12]

Perceived barriers for the participation in physical activity and exercises may vary from person to person depending on their demographic characteristics. Although personal and environmental barriers for visually impaired individuals need to be addressed separately, there is insufficient information in the literature about valid and reliable questionnaires which assess the barriers to prevent the regular participation in physical activity and exercises.[13] Therefore, the aim of our study was to develop the Turkish version of the Physical Activity Barrier Scale (PABS) to determine its appropriateness for Turkish society and the effectiveness of its use by researchers.

METHODS

Participants

The study was carried out at Hacettepe University, Faculty of Health Sciences, Department of Physiotherapy and Rehabilitation between January 2016 and August 2016. Inclusion criteria were being 17 years of age or above; being blind or having low vision; having sufficient cooperation; having no cognitive or emotional problems; participating voluntarily in the study, and signing the informed consent form. The study was approved by the Ethics Committee of Hacettepe University (GO 16 / 79-03).

Measures

The demographic information of the participants, such as their age, gender, weight, body mass index (BMI), diagnoses, occupation, educational status, visual acuity, and the duration of visual impairments etc. were recorded.

Instruments

Physical Activity Barrier Scale for Blind and Visually Impaired Individuals

The PABS for Blind and Visually Impaired Individuals was developed by Lee et al. This scale is composed of 48 questions that investigate the factors that prevent the participation in exercises and ask whether each factor listed is a hindrance to performing physical activities, and if yes, its frequency. The categories of the scale are: environmental

factors (such as exercise facilities or the weather), social influences (such as family support), psychological aspects (such as motivation), personal matters (such as time), health-related factors (such as pain or disabilities), safety factors (such as fear of injury), knowledge related factors (such as a lack of skills), and factors related to visual impairment (such as dim or bright lights).[14] Before starting the present study, approval was obtained to translate the PABS into Turkish.

International Physical Activity Questionnaire

The physical activity level of the participants was assessed by the International Physical Activity Questionnaire-Long Form (IPAQ). With this questionnaire, individuals are asked about the time they have spent on work, transportation, housework, housekeeping and care of the family, rest, and physical activity during the last 7 days. The total physical activity score (MET-min/week) was found by calculating the duration of severe and moderate activity and gait, and converting them to the Metabolic Equivalent (MET) corresponding to the basal metabolic rate. The total sitting time was also recorded. Saglam et al. demonstrated the reliability and validity of the Turkish version of this questionnaire.[15] The Turkish version of the IPAQ was used in the present study, and approval was obtained for its use.

Procedures

We used the guidelines for the cultural adaptation and translation of the PABS. The translation from English to Turkish was performed by two different and independent native authors. The two Turkish forms were compared, and inconsistencies were discussed. Following this, two native English speakers retranslated the Turkish form to English. The English form was then compared with the original English version to detect possible mistakes. The pre-final version of the Turkish PABS was tested on 10 people and it was reviewed for cultural adaptation.

Statistical analysis

We used test-retest reliability and internal consistency to evaluate reliability. The intraclass correlation coefficient (ICC) was used to evaluate test-retest reliability. For test-retest reliability, the form was applied at 1- to 7-day intervals. The ICC can vary from 0.00 to 1.00, where values of 0.60 to 0.80 are considered as the evidence of good reliability and those above 0.80 indicates excellent reliability.[16,17]

The coefficient of internal consistency was assessed with Cronbach's alpha. It is suggested that the value of alpha should be above 0.80 for the acceptance as having high internal consistency.[18] The construct validity was assessed by comparing the scores of the PABS to the scores of the IPAQ. Construct validity coefficients (r) were accepted as follows: 0.81-1.0 as excellent, 0.61-0.80 as very good, 0.41-0.60 as good, 0.21-0.40 as fair, and 0-0.20 as poor. Construct validity was measured by Pearson's correlation coefficient.[19] Mean and standard deviations were determined to describe the demographic data of the participants. All statistical analyses were performed with the Statistical Package for the Social Sciences Version 22.0 (IBM SPSS 22.0 for Windows, IBM Corp, Armonk, NY, USA). A probability value of $p<0.05$ was considered to indicate a significant effect

RESULTS

A total of 137 people with visually impairment living in Ankara participated in the present study. Participants consisted of blind people (n=84) and those with low vision (n=53). The mean age of the participants was 43.03±13.75 years. The mean BMI was 26.11±4.77 kg/m^2. The characteristics of the participants were given Table 1. Participants' physical activity scores are summarized in Table 2. Their total physical activity levels were good, and they were found to spend 374.51 minutes sitting on average per day.

Reliability

Concerning internal consistency, the alpha coefficients (Cronbach's coefficient alpha) of the PABS were 0.933 for the test and 0.894 for the re-test measurements. High internal consistency was found in both the test and re-test scores of the PABS. The test-retest ICC values of the PABS are shown in Table 3. The ICC values of each question and the total score indicate good test re-test reliability.

Validity

There were poor and fair correlations between The Turkish version PABS and subscales of IPAQ (between r=0.031 (p=0.719) and r=0.246 (p=0.004)).

Table 1. Characteristics of the participants (N=137).

	n (%)
Gender	
Female	36 (26.3)
Male	101 (73.7)
Body mass index	
Normal	86 (62.8)
Overweight	39 (28.5)
Obese	8 (5.8)
Unspecified	4 (2.9)
Working status	
Working	46 (33.6)
Retired	34 (24.8)
Student	26 (19.0)
Notworking	26 (19.0)
Unspecified	5 (3.6)
Participants	
Blind	84 (61.3)
Low Vision	53 (38.7)
Visual impairment	
Congenital	76 (55.5)
Acquired	51 (37.2)
Unspecified	10 (7.3)

Table 2. The Physical Activity Levels of the Participants (The International Physical Activity Questionnaire-Long Form (IPAQ)) (N=137).

	X±SD
Transport	858.8±1003.4
Domestic and Garden	894.2±2235.7
Leisure-Time	698.2±1195.0
Vigorous Physical Activity	720.3±2627.0
Moderate Physical Activity	1578.6±3017.7
Walking	1750.6±1787.2
Physical Activity	4049.4±4956.6
Total minutes/week	
Weekday Sitting	1886.7±939.0
Weekend Day Sitting	740.4±417.3
Sitting	2621.6±1198.3

DISCUSSION

Individual participation in physical activity is just as important as collective participation for disabled people as it is a way to exist in society and protect their physical health.[12] Our study has shown that the Turkish version of the PABS for visually impaired individuals was reliable. However, there was no correlation between the PABS and the IPAQ, which was used for validation.

The study set out to include completely blind individuals and those with low vision with variable visual acuity levels. Although this goal was achieved, the majority of participants had congenital disabilities, which are a result of consanguineous marriage in our country. Nevertheless, university graduates and working individuals with more awareness of the importance of physical activity comprised the highest numbers of participants.

Participant BMI showed that one third of the participants were either overweight (28.5%) or obese (5.8%), and the large majority had a normal range. While the IPAQ reports a "good" level of total physical activity, our results suggest that the IPAQ does not accurately reflect the situation of the impairment group. Moreover, when we investigated the total sitting time of the participants, it was found that they spent an average of 374.51 minutes per day sitting.

The reliability level was found to be "good" in this study, therefore indicating that the responses of the participants to the questionnaires were reliable.

In our validation study, no correlation was found between the IPAQ and the Visually Impaired Barrier Scale. The reason for this may have been related to the fact that the IPAQ was used with healthy individuals or chronic patients such as those suffering from schizophrenia or cardiovascular diseases.[20,21] However, it has not been previously used with visually impaired individuals or any other disability group. Considering that visually impaired individuals do not have similar opportunities to perform physical activities as healthy people, the lack of a relationship may be justified. Another explanation for the lack of a relationship between the two scales may be that activities such as cycling, dancing or bowling mentioned in the IPAQ may not be appropriate for each population and especially for each group of impaired individuals.

Miller and Jerome, in their study in which they asked 18 people who were visually impaired about physical activity barriers, they listed these barriers as: people do not have

Table 3. Test-retest reliability for the Turkish version of the Physical Activity Barrier Scale.

Test items	ICC (95% CI)
1- Yeteneğin olmaması	0.874 (0.807-0.918)
2- Egzersiz aletinin olmaması	0.690 (0.548-0.793)
3- Egzersiz yerlerindeki aktivitelerin değişmesi ve duş alma	0.625 (0.464-0.745)
4- Engelimden dolayı fiziksel koşullarım	0.824 (0.734-0.885)
5- Egzersiz için nereye gideceğini bilememek	0.672 (0.526-0.780)
6- Egzersiz ekipmanlarını nasıl kullanacağını bilememek	0.637 (0.480-0.755)
7- Benzer engel durumuna sahip bireylerle egzersiz yapma yerinin olmaması	0.664 (0.514-0.774)
8- Egzersiz veya fiziksel aktivite yapacağım zaman görüntüm hakkında utanmam veya içe kapanıklığımdan	0.904 (0.852-0.938)
9- Egzersiz veya fiziksel aktiviteye ilgimin az olması	0.727 (0.600-0.818)
10- Adapte edilmiş egzersiz aletine ilginin olmaması	0.623 (0.459-0.745)
11- Kişisel disiplinin olmaması	0.698 (0.560-0.798)
12- Yardım için eğitimli personelin olmaması	0.661 (0.512-0.772)
13- Aile desteğinin olmaması	0.589 (0.419-0.719)
14- Egzersiz programını öğrenmedeki güçlük	0.727 (0.600-0.819)
15- Egzersiz veya fiziksel aktivite yaparken eğlencenin olmaması	0.741 (0.618-0.828)
16- Yardım için gönüllülerin olmaması	0.719 (0.588-0.813)
17- Hevesin kırılması	0.665 (0.517-0.774)
18- Engel/durumum için en iyi egzersiz tipini bilmiyor olmak	0.610 (0.446-0.735)
19- Fiziksel durum/becerimi insanlar yanlış anlayacak diye	0.883 (0.821-0.925)
20- Egzersiz uygulamalarına fiziksel ulaşım	0.767 (0.653-0.846)
21- Egzersiz için yer veya uygulamaların olmaması	0.563 (0.387-0.700)
22- Nasıl egzersiz yapacağını bilmiyor olmak	0.950 (0.922-0.968)
23- Duş almanın zaman alıyor olması ve egzersizlerin değişiyor olması	0.704 (0.566-0.804)
24- Zayıf sağlık durumu	0.859 (0.786-0.909)
25- Egzersiz yerine gitmede ulaşımın olmaması	0.701 (0.565-0.800)
26- Ağrı veya rahatsızlık	0.757 (0.641-0.839)
27- Yapacağı şeylerin farkında olmama	0.711 (0.578-0.807)
28- Kendimi hazırlamak çok zahmetli	0.857 (0.783-0.907)
29- Yaralanmadan korkmak	0.618 (0.456-0.740)
30- Motivasyonun olmaması	0.730 (0.604-0.821)
31- Uygun olan aktiviteler ilgimi çekmiyor	0.770 (0.659-0.849)
32- Geçmişte egzersizlerle ilgili hoş olmayan deneyimler	0.636 (0.480-0.754)
33- Egzersiz ücreti	0.696 (0.556-0.798)
34- İnsanların arkadaşça olmayan davranışları	0.854 (0.779-0.906)
35- Duşun veya eğitimin uygun olmaması/zahmetli olması	0.695 (0.555-0.796)
36- Tehlikeden korkma veya güvende hissetmeme	0.839 (0.757-0.895)
37- Egzersiz yapmak için zamanın olmaması	0.790 (0.687-0.862)
38- Sağlığın artırılması için yapılan egzersizin yoğunluğu benim için çok fazla	0.715 (0.586-0.814)
39- Çok soğuk ya da çok sıcak	0.446 (0.245-0.611)
40- Çok hızlı hareket ediliyor olmasından dolayı tereddüt ediyorum	0.742 (0.619-0.829)
41- Beklenmedik engeller	0.730 (0.602-0.822)
42- Kazalardan korkma	0.688 (0.547-0.791)
43- Egzersiz uygulamalarında çok fazla merdiven var	0.667 (0.519-0.776)
44- Loş veya parlak lambalar	0.756 (0.639-0.839)
45- Az görmem veya görme engelli olmam	0.839 (0.755-0.895)
46- Kaybolmaktan korkma	0.653 (0.500-0.766)
47- Yardımcı aletimi (baston) koyacak yerin olmaması	0.874 (0.807-0.918)
48- Ulaşım saatlerinin bilgisi	0.784 (0.679-0.858)
Total Score	0.850 (0.772-0.902)

ICC: Intraclass Correlation Coefficient. CI: Confidence Interval.

enough time, cost, lack of exercise partners and places to exercise and/or these places are not blind-friendly places.[22] In this study, as in Miller and Jerome's study, the responses given by the visually impaired participants showed that they have difficulty in going to appropriate locations for exercise; not know how to use exercise tools or how to exercise; and have problems with their physical condition due to their disability. On the other hand, many factors such as architectural barriers in the environment or inadequacies in auditory stimuli cause limitations in walking activity, which constitutes an important part of physical activity in visually impaired individuals. This may be regarded as a reason why the questions in the IPAQ did not correspond to the existing physical activities of visually impaired individuals.

Although visually impaired individuals are introduced to physical activity and exercise for short durations in the primary school curriculum, it is not possible for them to translate these activities from the school environment into real life. Considering that motor problems may be related to low visual sensation from childhood on, more support is needed in this area at schools.[4,6,12] In addition, it may be difficult for every visually impaired young person and individual to reach these exercises and generalize them to the whole society.[23]

For this reason, it is important to eliminate these barriers in the environment by making new environmental arrangements that provide the visually impaired with a chance to perform physical activity. For example, using other sensory stimuli such as tactile, auditory, and other sensory clues for blind individuals and using contrast-colored materials for individuals with low vision may help to eliminate these barriers and provide the visually impaired with an opportunity to exercise in their adopted environment.[12]

The purpose of this study was to investigate the use of the Turkish version of the PABS, its relevance for Turkish society, and the effectiveness of its clinical use in order to offer it to other researchers. Nevertheless, our data has once again emphasized the importance of developing programs for increasing the physical activity levels of visually impaired individuals.

Limitations

The present study has some limitations. One of them is that as there was no other version of the PABS in other languages, we did not have the opportunity to discuss and compare physical activity barriers between visually impaired individuals living in other countries and our country. Another one is the lack of Turkish versions of questionnaires for individuals with other disabilities as well as the lack of information about the barriers that may vary according to disability type and the participation in physical activity, which also limit our ability to discuss and compare our results.

Conclusion

Visually impaired individuals need to overcome more barriers than healthy people in order to maintain and increase their physical activity. It is thought that the development of the Turkish version of the PABS has produced a feasible and unique scale to determine barriers to physical activity. The use of the PABS may lead to more specific and realistic measurements and help determine the barriers that prevent the visually impaired from participating in physical activities. Moreover, this study will provide an important guide for further studies aiming to research ways of combating these barriers. Future studies are needed to look into ways of increasing the physical activity levels of visually impaired individuals; improving their participation in physical activities starting from a young age; training them to develop appropriate physical activity habits; and showing society that they are our equals and we should all benefit from opportunities together.

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REFERENCES

1. Collanbrander A, Schuchard RA, Fletcher DC. Evaluating visual function. In: Low Vision Rehabilitation:Caring for The Whole Person. Fletcher DC, editor. 1st ed. San Francisco: American Academy of Ophthalmology; 1999:25-47.
2. Faye EE, Albert DL, Freed B, et al. Defining Low Vision. The Lighthouse Ophthalmology Resident Training Manual A New Look at Low Vision Care. NY: Lighthouse International; 2000.
3. Resnikoff S, Pascolini D, Etya'ale D, et al. Global data on visual impairment in the year 2002. Bull World Health Organ. 2004;82:844-851.
4. Atasavun Uysal Si Duger T. A Comparison of motor skills in turkish children with different visual acuity. Turk J Physiother. 2011;22:23-29.
5. Atasavun Uysal S, Erden Z, Akbayrak T, et al. Comparison of balance and gait in visually or hearing impaired children. Percept Mot Skills. 2010;111:71-80.
6. Aslan U, Calik BB, Kitis A. The effect of gender and level of vision on the physical activity level of children and adolescents with visual impairment. Res Dev Disabil. 2012;33:1799-1804.
7. Caspersen CJ, Powell KE, Christenson GM. Physical activity, exercise, and physical fitness: definitions and distinctions for health-related research. Public Health Rep. 1985;100:126-131.
8. Jensen MD, Ryan DH, Apovian CM, et al. 2013 AHA/ACC/TOS guideline for the management of overweight and obesity in adults: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines and The Obesity Society. Circulation. 2014;129:102-138.
9. WHO Organization. International Classification of Functioning, Disability, and Health. Geneva 2001.
10. Longmuir P, Bar-Or, O. Factors influencing the physical activity levels of youths with physical and sensory disabilities. Adapt Phys Act Q. 2000;17:40-53.
11. Houwen S, Hartman E, Visscher C. Physical activity and motor skills in children with and without visual impairments. Med Sci Sports Exerc. 2009;41:103-109.
12. Lieberman LJ. Performance of visually impaired youngsters in physical education activities: Implications for mainstreaming. 5 th ed. Winnick JP, editor. Champaign, IL: Human Kinetics; 2011.
13. Marston JR, Golledge GR. The hidden demand for activity participation and travel by people with vision impairment or blindness. J Vis Impair Blind. 2003;97:475-83.
14. Lee M, Zhu W, Ackley-Holbrook E, et al. Calibration and validation of the Physical Activity Barrier Scale for persons who are blind or visually impaired. Disabil Health J. 2014;7:309-317.
15. Saglam M, Arikan H, Savci S, et al. International physical activity questionnaire: reliability and validity of the Turkish version. Percept Mot Skills. 2010;111:278-284.
16. Portney LG, Watkins MP. Foundations of Clinical Research: Application to Practice Norwalk, CT,USA: Appleton&Lange; 1993.
17. Shrout PE, Fleiss JL. Intraclass correlations: uses in assessing rater reliability. Psycho bullet. 1979;86:420-428.
18. Bellamy N. Musculoskeletal Clinical Metrology. Boston, MA, USA: Kluwer Academic; 1993.
19. Feise RJ, Michael Menke J. Functional rating index: a new valid and reliable instrument to measure the magnitude of clinical change in spinal conditions. Spine. 2001;26:78-86.
20. Feehan AG, Zacharin MR, Lim AS, et al. A comparative study of quality of life, functional and bone outcomes in osteogenesis imperfecta with bisphosphonate therapy initiated in childhood or adulthood. Bone. 2018;113:137-143.
21. Ohi K, Kataoka Y, Shimada T, et al. Meta-analysis of physical activity and effects of social function and quality of life on the physical activity in patients with schizophrenia. Eur Arch Psychiatry Clin Neurosci. 2019;269:515-527.
22. Miller K, Jerome GJ. Self-monitoring physical activity, diet, and weight among adults who are legally blind: exploratory ınvestigation. JMIR Rehabil Assist Technol. 2022;9:e42923.
23. Martin JJ, Snapp EE, Moore EWG, et al. Factor structure of the barriers to physical activity scale for youth with visual impairments. Adapt Phys Activ Q. 2021;38:585-604.