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Cross cultural adaptation and reliability of the Turkish version of Amputee Body Image Scale (ABIS)

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Abstract. *Objectives:* The Amputee Body Image Scale (ABIS) is a self assessed questionnaire with 20 items created to measure body image perception of amputees. The questions assess how an individual perceives and feels about his or her body experience. But no Turkish version is available. The aim of this study was to cross-culturally adapt the ABIS for use with Turkish speaking lower limb amputees and to determine reliability.
Methods: The sample consisted of 50 transtibial amputees. The mean age of the participants was 43.14, SD: 14.66. The ABIS has been filled by the patients for two times.
Results: Internal consistency of the ABIS was very high (Cronbach alpha 0.834 for test and 0.842 for retest). The test-retest reliability was excellent for the ABIS (ICC = 0.939, 95% CI 0.895-0.965).
Conclusions: The Turkish version of the ABIS is a reliable instrument to assess body image in lower limb amputees.

Keywords: Body image, ABIS, amputee, reliability

1. Introduction

Body image is defined by Breakey as "the mental picture a person forms of his or her physical self". The perception of an individual's own physical uniqueness influences the individual's subjective well being [4]. There are two components of body image: the perceptual part (how one sees his own body) and the attitudinal part (how one feels about his perceived bodily appearance) [8]. Amputation is a triple threat and it involves loss of function, loss of sensation, and the loss of body image [21,26].

Psychosocial factors have recently been demonstrated to influence the prosthetic rehabilitation of individuals with an amputation [11,13,15]. The one of the important factor in the rehabilitation of amputees that is often overlooked is the individual's responses to amputation, including the changes in body image of amputee patients and the extent to which these changes influence functional outcomes [5,17–19,27].

It has been demonstrated that there was a significant relationship between body image and life satisfaction, indicating the more negative an amputee feels about his or her body image, the less satisfied he or she is with his or her life [5].

It was demonstrated that a person who has difficulty accepting his or her body image as an amputee or as someone with prosthesis is likely to reject the use of the prosthesis and to experience difficulty in functional and social adjustment. Body image plays a role in predicting psychosocial adjustment to leg amputation [22]. Therefore, the assessment of body image in amputees is very important.

The Amputee Body Image Scale (ABIS) is a 20 items questionnaire created to measure body image perception of amputees. The questions assess how an indi-

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vidual perceives and feels about his or her body experience. Some studies have confirmed the reliability and validity [5], Chinese version [16] and psychometric properties through rasch analysis of ABIS [12]. Cross-cultural adaptation of outcome instruments has been advocated in order to facilitate their use in international multicenter trials [25].

A reliable and cross cultural adapted body image instrument is essential for amputation rehabilitation services. Currently there is no body image measuring instrument in use in Turkey. The aim of this study was to cross-culturally adapt the ABIS for use with Turkish speaking lower limb amputees and to determine reliability.

2. Material and methods

2.1. Patients

The study included 50 transtibial amputees, with an age range of 18–60 years. Selection criteria for the study were:

- the amputees who have been using their prosthesis for at least six months
- no previous major trauma history
- no mental and cognitive function deficiency

During their initial visit to the clinic, patients first signed a written informed consent form.

2.2. Amputee Body Image Scale

Amputee Body Image Scale (ABIS) as shown in Table 1, is comprised of 20 items. The ABIS assesses how an amputee perceives and feels about his or her body experience as research works by Breakey [5]. The response to each item ranges from 1 (none of the time) to 5 (all of the time). This scale produces scores that range from 20–100, with high scores indicating high body image disturbance. Three questions (question 3, 12 and 16) are reverse-scored. Permission was granted to use and translate the ABIS developed by James Breakey.

2.3. Translation and cross-cultural adaptation

Cross-cultural adaptation of the ABIS was performed according to guidelines of the American Association of Orthopaedic Surgeons Outcomes Committee [2]. Two translations from English to Turkish were performed by two different and independent translators whose mother language was Turkish, allowing detection of errors and divergent interpretations of items with ambiguous meaning in the original instrument. One of the translators was aware of the process purpose and the concepts involved in the instrument to obtain a better idiomatic and conceptual rather than literal equivalence between the two versions of the questionnaire, and to render the intended measurement more reliable. The other translator was unaware of the translation objective, and this was useful in eliciting unexpected meanings from the original tool. Both Turkish translations were then retranslated, also blindly and independently, into English by two native English speakers. Each English translation was then compared with the original English ABIS version and checked for inconsistencies.

The Turkish version was then jointly reviewed by a bilingual team, including the all translators to assess the necessity of performing a cultural adaptation and to fine–tune it for use among Turkish patients. They again compared the Turkish version with the original English version to detect errors of interpretation and differences that might have been missed. The final stage of the adaptation process is the test of the prefinal version. Pretesting of the pre-final Turkish version revealed no further difficulties with the questionnaire in twenty patients randomly selected.

In our previous study, ABIS was found as a valid assessment in transtibial amputees [1].

3. Data analysis

All data analysis was conducted using SPSS software (SPSS for windows13.0.1).

3.1. Reliability

Two common forms of reliability are test-retest reliability and internal consistency. Test-retest reliability measures stability over time, by administering the same test to the same subjects at two points in time. The appropriate length of the interval depends on the stability of the variables which causally determine that which is measured. In this investigation, a time interval of two days was used. Such a short interval can ensure there would be no significant difference in their perceived body image. We used intraclass correlation coefficient (ICC) to evaluate test-retest reliability. ICCs can vary from 0.00 to 1.00 where values of 0.60 to 0.80 are regarded as evidence of good reliability, with

Table 1
The Original Amputee Body Image Scale (ABIS)

1	– Because I am an amputee, I feel more anxious about my physical appearance in social situation than when I am alone.
2	– I avoid wearing shorts in public because my prosthesis would be seen.
3	– I like my overall physical appearance when wearing my prosthesis.
4	– It concerns me that the loss of my limb impairs my body's functional capabilities in various activities of daily living.
5	– I avoid looking into a full-length mirror in order not to see my prosthesis.
6	– Because I am an amputee, I feel anxious about my physical appearance on a daily basis.
7	– I experience a phantom limb.
8	– Since losing my limb, it bothers me that I no longer conform to society's ideal of normal appearance.
9	– It concerns me that the loss of my limb impairs my ability to protect myself from harm.
10	– When I am not wearing my prosthesis, I avoid situations where my physical appearance can be evaluated by others (e.g. avoid social situations, swimming pool or beach activities physical intimacy).
11	– The loss of my limb makes me think of myself as disabled.
12	– I like my physical appearance when not wearing my prosthesis.
13	– When I am walking, people notice my limp.
14	– When I am wearing my prosthesis, I avoid situations where my physical appearance can be evaluated by others (e.g. avoid social situations, swimming pool or beach activities physical intimacy).
15	– People treat me as disabled.
16	– I like the appearance of my stump anatomy.
17	– I wear baggy clothing in an attempt to hide my prosthesis.
18	– I feel I must have four normal limbs to be physically attractive.
19	– It is important the size of my prosthesis and remaining anatomy of the affected limb are the same size as the other limb.
20	– I avoid looking into a full-length mirror in order not to see my stump anatomy.

The questionnaire is designed to measure how you see and feel about your body image. It is not a test so there are no right or wrong answer. Please answer each item as carefully and as accurately as you can by placing the appropriate number inside each questions as follows.
1 = None of time, 2 = Rarely, 3 = Some of the time, 4 = Most of the time, 5 = All of the time.

those above 0.80 indicating excellent reliability [24]. Portney and Watkins [20] claim that for most clinical measurements, reliability should exceed 0.90 to ensure reasonable validity. Reliability below the acceptable level indicates that the measure has too high a level of random measurement error [7]. The internal consistency of a scale relates to its homogeneity. The coefficient of internal consistency is mainly assessed with Cronbach's alpha [6]. It is suggested that the value of alpha should be above 0.80 for acceptance as high internal consistency [3]. We also used the item-total correlation which is other form of reliability. A high item total correlation means the item is highly correlated with the overall scale [9].

For construct validity, factor structure of ABIS was examined by factor analysis. Principal factors extraction with varimax rotation was performed on the ABIS [10].

4. Results

A total of 50 transtibial amputees were participated in the study. The demographic characteristics were presented at Table 2.

4.1. Cross cultural adaptation

The final Turkish version is shown in Table 3. Forward and back translation of ABIS revealed no major problems or language difficulties. Item 7 " I experience a phantom limb" needed consensus discussion. This item was translated as " Uzvum varmıþ gibi hissediyorum" (I feel that I have my limb) rather than "I experience a phantom limb". Patients understood this expression more easily.

Table 2
Demographic characteristics of amputees

	X	SD
Age (year)	43.1	14.6
Duration of amputation (year)	1.8	1.5
Causes of amputation	*n*(%)	
Traffic accident	9 (18)	
Peripheral vascular diseases	11 (22)	
Work-related injuries	4 (8)	
Tumour	3 (6)	
Bullet wound injuries	21 (42)	
Train accident	2 (4)	
Total	50 (100)	

4.2. Reliability

The patients were asked to complete the ABIS on the day after admission and after two days and these test-retest ABIS data were collected for reliability testing. Test-retest reliability was determined by Intraclass Correlation Coefficient (ICC). Test-retest reliability was excellent for the ABIS (ICC = 40.939). Internal con-

Table 3
Türkçe Ampute Vücut İmajıSkalası

1	– Ampute olduğum için yalnız kaldığım zamanlara göre sosyal ortamlarda fiziksel görünümüm konusunda kendimi oldukça endişeli hissediyorum.
2	– Protezim görülebileceği için toplum içinde şort giymekten kaçınıyorum.
3	– Protezimi giydiğim zaman tamamıyla fiziksel görünümümden hoçlanıyorum.
4	– Uzvumun kaybının çeşitli günlük yaşam aktivitelerinde vücudumun fonksiyonel yeteneklerimi bozmasıbeni endişelendiriyor.
5	– Protezlerimi görmemek için boy aynasına bakmaktan kaçınıyorum.
6	– Ampute olduğum için günlük yaşamda fiziksel görünümüm konusunda endişeli hissediyorum.
7	– Uzvum varmış gibi hissediyorum.
8	– Uzvumu kaybettiğimden beri toplumun normal görünüm beklentisini artık yerine getiremediğim için bu durum beni rahatsız ediyor.
9	– Uzvumun kaybının tehlikelerden kendi kendimi koruma yeteneğini bozmasıbeni endişelendiriyor.
10	– Protezimi giymediğim zaman fiziksel görünümümün diğer kişiler tarafından inceleneceği durumlardan kaçınıyorum (örneğin toplumsal alanlar, yüzme havuzu, plaj, fiziksel temas).
11	– Uzvumun kaybıkendimi özürlü olarak düşünmeme neden oluyor.
12	– Protezimi giymediğim zaman fiziksel görünümümden hoşlanıyorum.
13	– Yürürken insanlar benim topalladığımıfark ediyorlar.
14	– Protezimi giydiğim zaman fiziksel görünümümün diğer kişiler tarafından inceleneceği durumlardan kaçınıyorum (örneğin toplumsal alanlar, yüzme havuzu, plaj, fiziksel temas).
15	– İnsanlar bana özürlüymüşüm gibi davranıyor.
16	– Güdüğümün anatomik görünüşünden hoşlanıyorum.
17	– Protezimi saklamak için geniş kıyafetler giyiyorum.
18	– Fiziksel olarak çekici olmak için dört normal uzva sahip olmam gerektiğini düşünüyorum.
19	– Protezimin büyüklüünün ve etkilenmiş uzvun geriye kalan kısmının anatomisinin diğer uzuvla aynıbüyüklükte olmasıönemlidir.
20	– Güdüğümün şeklini görmemek için boy aynasına bakmaktan kaçınıyorum.

Bu anket vücudunuz hakkında neler hissettiğinizi değerlendirmek amacıyla oluşturulmuştur. Lütfen her maddeyi dikkatlice okuyun ve durumunuza uygun seçenek kutusunu (*x*) *ile işaretleyin.*
1 = Hiç bir zaman, 2 = Nadiren, 3 = Bazen, 4 = Sıklıkla, 5 = Her zaman.

Table 4
ICC and Cronbach alpha values of test and retest

	Test	Retest
Cronbach alpha	0.834	0.842
ICC	95% CI 0.939	(0.895–0.965)

sistency was found adequate at both assessments with Cronbach's alpha at 0.835 for test and 0.842 for retest (Table 4).

Principal factors extraction with varimax rotation was performed on the ABIS. The Kaiser-Meyer-Olkin Measure of Sampling Adequacy was 0.712. The significance level of the Bartlett's Test of Sphericity was less than 0.001. The three factors (personal, social, functional) were labelled according to the items' nature of construct. Factor 1 was personal factor (question 3,5,6,7,12,16,17,18,20); factor 2 was social factor (question 1,2,8,10,11,14,15) and factor 3 was functional factor (question 4,9,13,19) (Table 5).

The descriptive statistics for the ABIS obtained during the test-retest are summarized in Table 6.

Pearson correlation coefficients for item total correlation were presented. As shown in Table 7, all factors were found to have good correlation with one another (ranged from r:0.578, $p < 0.001$, to r:0.808, $p < 0.001$). The personal factor and social factor had the highest relationship (r:0.808, $p < 0.001$).

Table 5
Amputee Body Image Scale (ABIS) Principal Factor Analysis With Varimax Rotation

ABIS Item No.	Factor 1	Factor 2	Factor 3
6	0.862		
3	0.855		
5	0.848		
18	0.834		
17	0.789		
7	0.712		
12	0.656		
16	0.631		
20	0.532		
2		0.877	
11		0.765	0.498
1		0.733	
10		0.638	0.346
14		0.625	
8		0.601	
15		0.529	
4			0.749
19			0.698
9			0.577
13			0.403

5. Discussion

The results of this study indicate that the Turkish version of ABIS is a reliable instrument for the measurement of body image in Turkish speaking amputees.

Psychosocial factors like body image disturbance have been influenced the prosthetic rehabilitation of

Table 6
Descriptive statistics for test and retest

	Test X ± SD	Retest X ± SD
Personal factor	22.04 ± 7.23	22.38 ± 7.75
Social factor	17.42 ± 8.42	17.20 ± 8.44
Functional factor	11.56 ± 3.69	11.62 ± 3.70
ABIS total	51.02 ± 17.56	51.20 ± 18.18

Table 7
The inter-item and item-total correlations for test and retest

	Personal factor	Social factor	Functional factor
Test			
Personal factor	–		
Social factor	r:0.808	–	
Functional factor	r:0.578	r:0.682	–
ABIS total	r:0.921	r:0.955	r:0.775
Retest			
Personal factor	–		
Social factor	r:0.837	–	
Functional factor	r:0.572	r:0.695	–
ABIS total	r:0.931	r:0.962	r:0.770

$p < 0.001$.

amputees [11,12,14]. The one of the important factor in the rehabilitation of amputees is the changes in body image and these changes influence functional outcomes [17,19,26,27]. Murray and Fox [18]. demonstrated moderate to high negative correlations between body image disturbance as measured by the ABIS and prosthesis satisfaction. It is therefore important to have standardized reliable measures of their body image disturbance and of the effectiveness of rehabilitation. The adaptation process can disclose important country-specific differences that if not addressed, might influence the performance of questionnaire and the interpretability of its results. In this study Turkish adaptation of the ABIS was performed following a systematic standardized approach [23].

We found excellent test-retest reliability in this self administered questionnaire. We have used the questionnaire on two successive days such as short interval would reduce the possibility of change in psychological status influencing the results.

We think that the strength of our study include the standardized methods used for all procedures for the cross cultural adaptation and consist of homogenous group for the study.

The internal consistency of ABIS was 0.84 in Gallagher et al.'s study [12]. Lai et al. [16] presented evidence to support the reliability for Chinese version of ABIS. They found that test-retest reliability was 0.857. In our study we found that test-retest reliability was excellent (ICC = 0.939 (95% CI, 0.895–0.965). In Breakey's study [5], Cronbach alpha was found to be 0.88. In this study internal consistency was with Cronbach alpha at 0.835 and 0.842 for test and retest respectively. The results of our study support the Breakey and Lai et al.'s findings.

In our study, we analyzed three factor structures (personal, social and functional) of ABIS demonstrated by Lai et al.'s [16]. All factors were highly correlated with each other. The personal factor and social factor had the highest relationship (r:808 $p < 0.000$). Lai et al. [16]. also found highest relationship between personal factor and social factor (r:0.652, $p < 0.000$). The results of factor correlation are similar to those reported by Lai et al.

The results of our study suggest that the Turkish version of ABIS is an easy to understand and reliable instrument for the measurement of the body image disturbance in the Turkish speaking amputees. We think that a study based on the Turkish population with different level of amputation would increase the value of our present study.

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