Cross-Cultural Adaptation and Validation of the Spanish Version of the Amputee Body Image Scale

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Article

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Abstract: Background: Assessing body image and personalized rehabilitation in lower limb amputation is essential to measure impact on an individual's quality of life and psychosocial wellbeing. The aim of this study was to develop a Spanish version of the Amputee Body Image Scale (ABIS-E) for Spanish-speaking lower limb amputee. Methods: A cross-sectional study was conducted including amputee patients in local in Madrid, Spain. Clinical outcomes about body image (Amputee Body Image Scale, ABIS), health-related quality of life (EuroQol-5D-5L), depression and anxiety (Hospital Anxiety and Depression Scale, HADS), pain (Brief Pain Inventory-Short Form, BPI-SF) and functional capacity (Prosthesis Evaluation Questionnaire, PEQ) were collected. Results: Seventy-three participants were assessed. Excellent test-retest reliability (ICC=0.847) and good internal consistency (Cronbach's alpha=0.753) were obtained. Three factors were extracted in the factor analyses. Convergent validity with Pearson's and Spearman's correlation coefficients were calculated for the depression and anxiety questionnaires (HADS) (values between .57 and .67), functional capacity (PEQ) (values between -.35 and .71) and quality of life (EQ-5D-5L) (values between -.37 and .61). Conclusions: The ABIS-E is a reliable and valid tool for measuring body image in the Spanish population with a lower limb amputation, potentially useful in primary care to identify psychosocial problems.

Keywords: amputation; body image; validation study; reproducibility of results

1. Introduction

Nowadays, limb loss and impairment are potentially disabling conditions that involve health and well-being of people around the world. Loss can happen for multiple reasons, such as diabetes mellitus (DM), peripheral vascular disease, trauma, tumors, infections, or congenital malformations [1]. In Western countries, peripheral vascular disease is the leading cause of amputation [2]. Lower limb amputations are the most frequent, up to 15 times more frequent in patients with DM than in the general population [3].

Furthermore, they have a 15-25% likelihood of developing a diabetic foot ulcer over their lifetime, with a recurrence rate of 50-70% within 5 years [4]. Subsequently, recurrent foot ulcers require amputation in 71-85% of incidents [5].

Approximately 80% of diabetic foot complications could be avoided with proper diabetes management and care [6]. This includes early detection [4], educating patients and healthcare providers, providing multidisciplinary treatment, and conducting frequent follow-ups [7].

Basic foot care should involve both the multidisciplinary specialized care team and the primary care team, who, due to their proximity to the patient, are best placed to identify foot health issues [6] and manage conditions which increase the likelihood of complications (such as hyperglycemia, hypertension, renal function, and smoking) [8,9].

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Morphological changes due to amputation also involve an alteration of functional capability, for example, a decrease in the skill to perform daily activities; this limitation directly reduces the quality of life and autonomy, and it has a decisive influence on the increase of phantom limb pain [10].

In addition, loss of the amputated limb has an important emotional, psychological, and perceptual impact due, among other reasons, to the loss of body image, understood as the appreciation of one's own body and its appearance [11]. It can be understood as a dynamic concept influenced by internal perceptions, social interactions, and environment [12].

This disappointment with self-image is significantly associated with depression and generalized anxiety, a poor perception of quality of life and self-esteem, low prosthetic acceptance and a lower participation in physical activities [13]. The presence of depression in these patients has been widely investigated – prevalence rates are between 20.8-45%. Palliating this situation is a crucial factor in achieving successful rehabilitation, as it can compromise functional recovery [14].

Typically, patients with post-amputation wounds after lower extremity amputation are discharged home from hospital and are primarily managed in the primary care setting by nurses who support the patient's transition to stability and normality. Effective primary care wound management as part of the continuum of care is therefore essential for patients' physical and psychosocial recovery. Several recent qualitative studies have explored issues related to patient mobility, focusing on the perceptions of reduced functionality and complicated prosthesis fitting by people living with amputation [15–17]. These issues highlight the challenge and complexity of the rehabilitation phase of major amputations after wound healing [18].

Moreover, Horgan & MacLachlan [19] revealed that a lack of social support is associated with a poor perception of quality of life and an increase in depressive symptoms. For those reasons, assessing accommodation to a different body image may be a way to measure psychosocial adaptation to amputation [19] and thus a surrogate for the other factors involved.

It is indeed under the hypothesis of a relationship between body image and psychosocial well-being that the Amputee Body Image Scale (ABIS), a self-administered questionnaire [11], was developed to assess the body image of the amputee patient from his or her own perspective. Breakey's original study [11] showed a Cronbach's alpha of 0.88 and good and significant concurrent validity with scales of anxiety, depression, self-esteem, and life satisfaction. It is currently validated in Portuguese, French, Chinese and Turkish [13,20–22].

The ABIS questionnaire is of great interest for the assessment of amputee patients due to its short length and speed of application and there is a lack of similar instruments in Spanish language. As such, it could be a useful tool in primary care consultations for early identification of features related to the patient's psychosocial environment.

Therefore, the main objective of this study was to achieve a culturally equivalent, reliable, and valid Spanish version of the Amputee Body Image Scale (ABIS-E) for use in Spanish-speaking lower limb amputee patients.

2. Materials and Methods

2.1. Study design

A two stages study was designed. First, translation and cross-cultural adaptation were developed. Second, an observational cross-sectional study was conducted following the COSMIN guide (COSMIN Study Design for Patient-reported outcome) (13) to evaluate psychometric properties of the questionnaire.

The study was previously approved by the Clinical Research Ethics Committee of the University Hospital 12 de Octubre (Madrid, Spain), with 21/040-E as the attributed protocol number, the January 27th, 2021. The study had been conducted in accordance with the principles set forth in the Helsinki Declaration and all the institutional and governmental regulations concerning ethical principles and privacy protection for research with human participants. It was developed in line with the Recommendations for the Conduct, Reporting, Editing and Publication of Scholarly Work in Medical Journals.

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2.2. Translation and cross-cultural adaptation

With the permission of the original author, Dr. James Breakey, the process was carried out according to the reverse translation-back translation method recommended for the cross-cultural adaptation of the health-related quality of life measures [14,15]:

1. Forward translation: Scale was translated into Spanish by two independent Spanish-English bilingual translators who were native Spanish speakers (T1 and T2). One of them was not aware of the purpose of the study (naive translator). The other one received limited information on the purpose and terminology used to obtain a better conceptual equivalence and make the questionnaire more reliable.

2. Synthesis: Both translations (T1-T2) were compared by the two translators and a neutral judge obtaining version T1+2. Discrepancies were resolved by consensus.

3. Back translations: Two back translations (BT1-BT2) of the version T1+T2 were conducted by two native English-speaking translators, also independent and unaware of the study's objective. It served as a validity check to clarify words and sentences used in translation stage.

4. Expert Committee: Final version was obtained by consensus agreed in an expert committee formed by all the translators, the neutral judge, experts in methodology and physiotherapists specialized in amputees' rehabilitation. They resolved discrepancies and doubts and achieved the Spanish version of ABIS (ABIS-E).

2.3. Reliability and construct validity analysis

2.3.1. Participants

Consecutive recruitment by convenience was performed. Sample was enrolled through the dissemination of the informative poster in social networks, local hospitals, and physiotherapy centers.

Target population involved all Spanish-speaking lower limb amputee patients who had expressed their voluntary agreement to participate in the study providing informed consent before data collection.

Inclusion criteria were lower limb amputation, age over 18 years old, prosthetic limb users, no difficulty to speak, read and understand Spanish. Participants were excluded if they had cognitive diseases or language impairments that made it difficult to understand the items.

The sample size was calculated using the G*Power software (version G*Power 3.1.9.2). We established according to previous studies [26] the following parameters to obtain the sample size using a correlation model: two tails, ϱ H1 of 0.8, an error alpha of 0.05, a power of 0.95, and a minimally acceptable ϱ H0 of 0.4, resulting in a sample size requirement of 31 participants [13,20–22].

2.3.2. Assessment

First, sociodemographic and clinical variables were collected: age; sex, occupation, place of origin, marital status, driving, playing sports, educational level; and clinical parameters: previous diseases, etiology, level of amputation; time since amputation and presence of phantom limb pain.

Body image: Spanish translation of the Amputee Body Image Scale (ABIS-E) self-administered questionnaire of 20 items [11] to assess the body image of the amputee patient from his or her own perspective. The participants are asked to indicate their responses to the questions using a scale of 1 (none of the time) to 5 (all the time). This scale produces scores from 0 to 100 where low scores indicate the relative absence of a body-image concern, and higher values indicate the presence of a more severe problem. Questions 3, 12 and 16 are reverse scored [11].

Quality of life: EuroQol - 5 Dimensions - 5 Levels (EQ-5D-5L). It's a questionnaire designed to be self-administered and to assess health-related quality of life (HRQoL). It comprises two parts: a descriptive system of five health dimensions (Mobility, Self-Care, Usual Activities, Pain/ Discomfort and Anxiety/Depression), and a visual analog scale (VAS) to elicit an individual's rating of their own overall current health (from 0 to 100) [27,28]. It consists of 5 response levels: value 1 is given to the

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best level (no problems) and 5 to the worst (unable to /extreme problems) [29]. Data collected using EQ-5D-5L can be presented in various ways according to its structure: presenting results from the descriptive system as a health profile (a 5-digit code with no arithmetic properties), as a measure of overall self-rated health status (VAS) or as an index value. It is also possible to categorize the scores into a qualitative scale of 5 categories [39]. It has been validated in Spanish [31,32] and used in studies with amputees [33].

Depression and anxiety: Hospital Anxiety and Depression Scale (HADS). It's a 14-item self-administered questionnaire originally developed to indicate the presence of anxiety and depression states for non-psychiatric patients. It consists of seven items for the anxiety subscale and seven for the depression subscale. The higher score in each subscale indicates higher levels of anxiety/depression. Between 0 and 7 the result is considered normal (absence of anxiety/depression), and from 11 onwards it is positive (presence of anxiety/depression) [34]. It is validated in Spanish [35].

Pain: Brief Pain Inventory-Short Form (BPI-SF). It includes a diagram to record the location of the painful area on a human figure, 9 items that comprises scales for assessing the severity and interference of pain, in which pain severity is recorded using numerical scales ranging from 0 (no pain) to 10 (worst possible pain) and a set of statements about the person's life activities, general activity, mood, ability to walk, work, social relationships, and ability to have fun, measured on a scale with ten values (from no interference to completely interferes) [36,37]. Higher scores indicate higher levels of pain [38]. It is validated in Spanish [39].

Functional capacity: Prosthesis Evaluation Questionnaire (PEQ). Self-administered questionnaire of 82 questions, of which 40 are individual and 42 are grouped in nine subscales that are not dependent on each other: satisfaction (3 items), pain (16 items), transfers (5 items), prosthetic care (3 items), self-efficacy (3 items), and questions about the importance of different aspects of the prosthetic experience (10 items). Originally, in 76 of the items the response format is using a VAS scale, with scoring in the form of a continuous numerical variable, with a value equal to the distance in millimeters from the left end of the line, ranging from 0 to 100. and the other 6 are presented in multiple choice format. It is specific for lower limb amputees [40] and validated in Spanish [41].

2.3.3. Procedure

Participating centers contacted by telephone with the patients who met the selection criteria to inform them about the study and offer them to participate. All those who showed willingness to participate were sent an e-mail by one of the raters with detailed information about the study, informed consent, relevant instructions, and a link holding all the self-administered questionnaires used though an online tool. At the same time, participants recruited from the informative poster spread through social networks accessed the same online tool to provide required information. Data were collected in an Excel sheet in an anonymized way.

For the analysis of the ABIS-E test-retest reliability, an email requiring completing again ABIS-E was sent to the same participants 7 to 10 days after the first assessment.

2.4. Statistical analysis

Statistical analysis was performed using IBM SPSS® statistical software (Statistical Package for the Social Sciences v.25 for Windows, SPSS Inc., Chicago, IL USA) [42].

First, a descriptive analysis of the variables studied was performed. The results obtained for qualitative variables were expressed as absolute and relative frequencies and quantitative variables as mean and standard deviation.

2.4.1. Reliability

The internal consistency of the ABIS questionnaire was assessed using Cronbach's alpha to obtain the item-total correlation. The thresholds described by Cronbach [43] were used: for $\alpha \geq 0.9$ is

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considered excellent, if ≥0.8 and <0.9 it is good, if ≥0.7 and <0.8 it is acceptable, if between 0.7 and 0.6 it is questionable, if between 0.6 and 0.5 it is poor, if <0.5 it is unacceptable.

Test-retest reliability measures stability over time, by administering the same test to the same participant at two points in time. Intraclass test-retest correlation was used to evaluate the test-retest reliability of the ABIS questionnaire. Limits were established as described by Fleiss et al. [44]: if ICC is >0.8 it is considered excellent reliability, if ≤0.8 and >0.6 it is good, if ≤0.6 and >0.4 it is moderate and if ≤0.4 it is poor.

2.4.2. Validity

For construct validity, factor structure of ABIS was examined by factor analysis. Principal factors extraction with varimax rotation was performed on the ABIS. The Kaiser-Meyer-Olkin (KMO) sampling adequacy measure was considered, which indicates the proportion of the variance in the variables that could be caused by underlying factors. High values (close to 1) indicate that a factor analysis may be useful with the data. If the value is lower than 0.5, it indicates that one or more items should not be included in the factor analysis, as they do not belong to the same universe shared by the other variables.

Bartlett's test of sphericity tests the null hypothesis that the correlation matrix is an identity matrix, in which case there would be no significant correlations between the variables and the factor model would not be relevant. Significance values less than 0.05 indicate that factor analysis can be useful with the available data [45].

Convergent validity was determined by Pearson's correlation coefficient as a parametric test and Spearman's correlation coefficient as a nonparametric test. The Kolmogorov-Smirnov test was used as a normality test (assuming normality if significance p>0.05). Correlations were considered: excellent if r>0.91, good if r is between 0.71-0.90, average if r is 0.51-0.70, and poor if r is 0.31-0.50. A correlation <0.30 is not considered significant [46].

3. Results

73 amputee patients fulfilled the questionnaires, 48 male (65.8%) and 25 female (34.2%). The mean age was 50.19 ± 14.71 years (range 20-82). Regarding the clinical characteristics of the sample, amputations were mostly traumatic (43.8%) followed by vascular ones (21.9%) with a mean time since amputation of 11.68 ± 12.34 years (range 0 - 57 years). The predominant level of amputation was femoral/suprachondyle in 35 participants (47.9%), followed by tibial/infrachondyle in 28 (38.4%). In terms of underlying pathologies, at least 13.7% of the patients had diabetes mellitus, and 42.5% of the sample reported phantom limb pain.

3.1. Cross-cultural adaptation of the ABIS

Regarding the two forward translations into Spanish, both versions were similar. They differed only in some points concerning form but not the content. For example, “usar/vestir/llevar puesta” for “wear(ing) my prosthesis”. In addition, both back translations were very similar to the original version in English, with only a few differences regarding vocabulary because of the use of synonyms, such as leg versus limb.

In relation to the Expert Committee’s reviews, some discrepancies were identified, which were reviewed obtaining the final version in Spanish. The differences found between the translations were mainly based on the use of technical language and lexical differences. First, a discrepancy occurred in item 1 when translating “social situations”: first translator determined “situaciones sociales” and second one “situaciones públicas”. Committee decided to modify into “en presencia de otros” because the concept was easier to understand.

Finally, “limb” was translated as “extremidad”, “miembro” y “pierna” which would be the more correct word for items 4, 8, 9, 11 since it is more appropriate in the context in which we are validating the questionnaire (lower limb amputation). However, the term "extremidad" was preferred for the item 18 because it refers to both lower and upper limbs.

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3.2. Validation of the ABIS-E

3.2.1. Reliability

The test-retest reliability of the ABIS-E questionnaire was evaluated by intraclass correlation (ICC). For this purpose, the questionnaire was returned to the participants 7-10 days after the first test and a total of 48 responses were received. The ABIS retest results were very similar to the initial evaluation (51.29 ± 11.240 vs 51.42 ± 11.776) (moderate body image disturbance). The test-retest reliability was considered excellent (ICC=0.847) 95%CI (0.777 - 0.904) and the internal consistency was adequate-good when analyzed by Cronbach's alpha, with a value of 0.753 for the test and 0.806 for the retest ($p<0.05$).

Table 1 shows the total-item correlation for each of the items of the ABIS-E questionnaire. The correlation expressed by Cronbach's alpha is very similar for all the items (>0.7), demonstrating adequate internal consistency.

Table 1. Summary Element-Total Statistics of the Spanish version of the Amputee Body Image Scale (ABIS-E).

	Scale means if item removed	Scale variance if item removed	Corrected item-total correlation	Cronbach's alpha if item removed
Item 1	49,19	122,518	,531	,729
Item 2	49,14	122,953	,390	,737
Item 3	47,66	152,312	-,436	,797
Item 4	48,11	120,154	,568	,725
Item 5	49,78	125,479	,434	,736
Item 6	49,41	122,634	,527	,729
Item 7	48,58	127,275	,347	,741
Item 8	49,44	121,194	,559	,726
Item 9	48,51	118,365	,596	,722
Item 10	49,27	122,813	,428	,735
Item 11	48,79	124,054	,426	,735
Item 12	48,44	150,722	-,367	,798
Item 13	48,07	127,981	,255	,748
Item 14	49,51	119,892	,619	,722
Item 15	49,03	126,388	,351	,741
Item 16	48,19	153,129	-,433	,801
Item 17	49,08	120,604	,483	,730
Item 18	49,16	117,889	,616	,720
Item 19	48,15	120,158	,439	,733
Item 20	49,56	118,889	,617	,721

3.2.2. Validity

- Construct validity

To evaluate the structural validity of the ABIS-E, factor analysis was used. Principal component extraction with Varimax rotation was performed. The Kaiser-Meyer-Olkin (KMO) sample adequacy measure was 0.779. The significance level of Bartlett's test of sphericity was p=0.000. The high value of the KMO measure obtained and the significance level of the sphericity test ($p<0.05$) confirm that the data set is suitable for factor analysis. In terms of total variance, the three factors accounted for 60.26% of total variance, which can be considered as a reasonable factor number.

In the rotation phase of the factor analysis, the aim was to achieve simpler and theoretically more meaningful factor solutions. The Varimax rotation was used to investigate factor loadings. The three factors (social, personal, functional) were labelled according to the items' nature of construct. Factor

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1 was personal factor (item 6,8,1,16,12,10,11,4,9,2,5); factor 2 was social factor (item 14,20,18,17,3,15,19,7) and factor 3 was functional factor (item 7,13) (Table 2).

Table 2. Rotated Component Matrix.[1.]

	Component 1	Component 2	Component 3
Item 6	,893		
Item 8	,858		
Item 1	,825		
Item 16	-,796		
Item 12	-,770		
Item 10	,738		
Item 11	,677		
Item 4	,674		
Item 9	,668		,517
Item 2	,665		
Item 5	,617		
Item 14		,921	
Item 20		,887	
Item 18		,821	
Item 17		,784	
Item 3		-,657	
Item 15		,637	
Item 19		,582	
Item 7			,597
Item 13			,579

- Convergent validity

Pearson's and Spearman's correlation indices were used to determine the convergent validity between the factors extracted from the ABIS-E and the other questionnaires used.

Significant correlations were obtained between factor 1 "Personal" of the ABIS with the PEQ questionnaire dimensions: Appearance (rho=-0.535, p=0.000), Wellness (rho=-0.570, p=0.000). The negative values are due to the inverse relationship of their scores: higher values for the ABIS show a disturbance of body image while for the PEQ they mean higher functionality. The highest correlation found was between the item "How annoying is it to see people looking at you and your prosthesis?" and factor 1 "Personal" (rho=0.712, p=0.000).

Comparing the ABIS with the BPI questionnaire, a statistically significant correlation was observed with its dimensions (interference/severity), although the coefficient was insufficient to be considered relevant (rho<0.3, p<0.05).

As for the HADS questionnaire, significant correlations were obtained between the factor 1 “Personal” and the two dimensions of the HADS questionnaire: depression (r=0.677, p=0.000) and anxiety (rho=0.575, p=0.000).

Correlation analysis with the EQ-5D-5L quality of life questionnaire showed a statistically significant correlation between factors 1 (personal) and 3 (functional). The highest correlation was observed between the EQ-5D-5L dimension "anxiety/depression" and factor 1 (rho=0.609, p=0.000) considered an average correlation.

4. Discussion

The aim of this study was to achieve a cross-cultural adaptation of the ABIS for Spanish-speaking lower limb amputees. The ABIS-E analysis showed an excellent test-retest reliability (evaluated with intraclass correlation) and an adequate-good internal consistency (evaluated with Cronbach’s alpha). Moreover, the final scores of ABIS-E obtained a high correlation with other functional capacity, depression, anxiety, and quality of life questionnaires and scales.

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This is the first study carried out to validate a questionnaire of these characteristics in Spanish amputee population. No relevant troubles were found during the process of translation and cross-cultural adaptation, that was performed according to the international recommendations [24,25], and participants reported no problems in understanding the proposed items.

The sample for this work has been recruited as the same inclusion and exclusion criteria and its characteristics are like other validation studies of ABIS [13,20–22]. In all studies, adult patients with enough cognitive function to understand and complete the questionnaire were selected. Regarding sex distribution, the predominant presence of men was common in all validation studies (65.8% in ours). The results match with other scientific literature reviewed, in which male gender is a risk factor for suffering complications resulting in amputation, especially in the case of diseases like diabetes [47].

Our results show a good reliability of the Spanish version of the ABIS-E questionnaire, demonstrated by a good internal consistency measured by Cronbach's alpha with a value of 0.753 for the test and 0.806 for the retest. Validation studies in French, Chinese, Turkish and Portuguese [13,20–22] showed higher alpha values for the test (>0.8).

We found an excellent test-retest reliability [ICC=0.847, 95%CI (0.777 - 0.904)]. We used the questionnaire at a fair interval (7-10 days) ensuring the internal validity of the design, avoiding both a quick measurement that could condition a recent recall of the application, and a delay that could cause excessive changes in the responses. Our results are slightly inferior to the ICC obtained in the validation study in French (ICC=0.87) [13], Chinese (ICC=0.86) [20] and Turkish (ICC=0.94) [22].

As analyzing the structure of the ABIS-E, we found three main factors: Factor 1 was personal factor (items 6,8,1,16,12,10,11,4,9,2,5); factor 2 was social factor (items 14,20,18,17,3,15,19,7) and factor 3 was functional factor (items 7,13). These findings confirm the results of Lai et al. [20] and Bumin et al. [21], who also found three factors that differentiate the personal, social, and functional dimensions.

In our correlation analysis, we observed that factor 1 (personal) of the ABIS-E questionnaire had an average correlation with the HADS questionnaire, both for the anxiety and depression dimensions. This agrees with the findings of Vouilloz et al. [13] and Breakey [11], who also found a positive relationship between the ABIS questionnaire and the presence of anxiety and depression.

We also found a significant relationship between ABIS-E and BPI-SF in both of its dimensions: severity and interference with factor 1 and 3, though it wasn't strong (r<0.3). In the French validation study, they also found poor correlation with pain severity and interference spheres [13].

Regarding to the PEQ (satisfaction with the prosthesis), a significant inverse correlation was found between factor 1 (personal) with the scales of appearance, sounds, residual limb health, frustration, social burden, ambulation, wellness and items A, B and I; factor 2 (social) with the appearance and sounds scales and A, B items; factor 3 (functional) with ambulation scale and P, A items. This shows that high scores on the PEQ and ABIS-E measure inverse facts: the higher the PEQ score, the higher the satisfaction with prosthesis-related aspects, while the ABIS-E indicates a worse body image the higher its evaluation. In this way, Millstein et al. propose that for any prosthesis to be accepted and used it must be comfortable, functional and have `a pleasing appearance' [48]. Also, Murray & Fox found that `functional satisfaction' with a prosthesis was also related to a positive body image, particularly among women [49]. In their whole sample, higher levels of overall satisfaction with their prosthesis (measured by TAPES scale) were correlated with lower levels of body image disturbance assessed by ABIS.

In the other direction (positive correlation) is factor 1 (personal) and the PEQ item "How annoying is it to see people looking at you and your prosthesis?" in which a higher score means greater importance, a fact it shares with the ABIS-E, with which it correlates strongly.

The scoring of the different dimensions of the EQ-5D-5L to assess the different aspects of quality of life was also found to be related to the scores obtained in the ABIS-E: the higher the score, the worse the quality of life and the greater the limitation. However, as the correlation itself indicates, the visual scale of this questionnaire and the calculated index are inversely related (higher scores indicate better quality of life). Factor 1 of the ABIS-E (personal) is the most strongly correlated. The other factors did not show a robust correlation, which matches with the French validation study by

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Vouilloz et al. [13], who also used a generic quality of life questionnaire (SF-36), and not specifically for amputees.

4.1. Study limitations

Sample size was wide enough to diminish random mistake, but men were more numerous, and the group was heterogeneous in terms of amputation characteristics: time since amputation, levels, and etiologies. Because of this, our results could extrapolate to the diversity of lower limb amputees, but mostly to the more common causes of amputation and men. It should also be pointed out that the research was purely exploratory, using only self-administered questionnaires. Some aspects of the evaluation must be verified in an in-person assessment. There are other non-studied variables that may indirectly influence body image satisfaction, such as socioeconomic status, sexual function, barriers to inclusion, different phantom limb sensations, which should be further investigated given their relevance to body image [50]. Despite the risk of bias of online assessment, it can provide a useful way to minimize interpersonal contact avoiding inherent risks (as COVID-19 transmission) and very interesting in remote populations as an efficient form to obtain useful information to improve lower limb amputees' management under a biopsychosocial approach.

5. Conclusions

In conclusion, the Spanish version of the ABIS questionnaire (ABIS-E) has demonstrated good psychometric properties for use among Spanish-speaking people with lower limb amputations. The reliability obtained was very good, with test-retest reliability considered excellent and good internal consistency. Factor analysis found a three-factor model: personal, social, and functional. Convergent validity demonstrated a good correlation of ABIS-E factors with the depression and anxiety questionnaires, functional capacity, and quality of life. ABIS-E is a valid and reliable tool to assess body image and related psychosocial factors in Spanish-speaking people with lower limb amputations, so this could be a useful tool for healthcare professionals (both primary and secondary care) to identify early psychosocial features.

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