

RESEARCH ARTICLE (ORIGINAL) 

# Translation, Cultural Adaptation and Validation of The Hemodialysis Arteriovenous Access Cosmesis Scale into European Portuguese

*Tradução, Adaptação Cultural e Validação da Hemodialysis Arteriovenous Access Cosmesis Scale para Português Europeu*

*Traducción, Adaptación Cultural y Validación de la Hemodialysis Arteriovenous Access Cosmesis Scale al Portugués Europeo*

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**Abstract**

**Background:** The cosmesis of vascular access (VA) is a subjective yet clinically relevant aspect of hemodialysis (HD), influencing body image, self-esteem, and adherence to the treatment regime. The Hemodialysis Arteriovenous Access Cosmesis Scale (AVACS) is the only known instrument that evaluates this aesthetic perception.

**Objective:** To carry out the translation, cultural adaptation, content validity, pretesting, and face validity of the AVACS into European Portuguese.

**Methodology:** A three-phase methodological study: (1) translation and cultural adaptation; (2) content validity assessment with 14 experts; (3) pretest with 20 patients and 20 healthcare professionals and face validity assessment through semi-structured interviews.

**Results:** The Hemodialysis Arteriovenous Access Cosmesis Scale – Portuguese version (AVACS-PT) achieved linguistic equivalence with the original version. The items had a Content Validity Index  $\geq 0.80$  and an excellent Kappa Coefficient. The pretest and face validity demonstrated the clarity, relevance, and clinical applicability of the Portuguese version of the scale.

**Conclusion:** The AVACS-PT is linguistically and culturally equivalent, clear, and valid for assessing the cosmesis of arteriovenous VA in HD patients in Portugal.

**Keywords:** arteriovenous fistula; renal dialysis; body image; validation studies as topic; questionnaires; patient reported outcome measures

**Resumo**

**Enquadramento:** A cosmese do acesso vascular (AV) é uma dimensão subjetiva, mas clinicamente relevante em hemodálise (HD), influenciando a imagem corporal, autoestima e adesão ao regime terapêutico. A *Hemodialysis Arteriovenous Access Cosmesis Scale* (AVACS) é o único instrumento conhecido que avalia esta perceção estética.

**Objetivo:** Tradução, adaptação cultural, validade de conteúdo, pré-teste e validade facial da AVACS para português europeu.

**Metodologia:** Estudo metodológico realizado em três fases: (1) tradução e adaptação cultural; (2) avaliação da validade de conteúdo com 14 peritos; (3) pré-teste com 20 pacientes e 20 profissionais e avaliação da validade facial através de entrevistas semiestruturadas.

**Resultados:** A *Hemodialysis Arteriovenous Access Cosmesis Scale* – versão portuguesa (AVACS-PT) alcançou equivalência linguística com a versão original. Os itens apresentaram índice de validade de conteúdo  $\geq 0,80$  e Coeficiente Kappa excelente. O pré-teste e a validade facial demonstraram clareza, pertinência e aplicabilidade clínica da versão portuguesa da escala.

**Conclusão:** A AVACS-PT é linguística e culturalmente equivalente, clara e válida para avaliar a cosmese do AV arteriovenoso em pacientes em HD em Portugal.

**Palavras-chave:** fistula arteriovenosa; diálise renal; imagem corporal; estudos de validação; questionários; medidas de resultados relatados pelo paciente

**Resumen**

**Marco contextual:** La estética del acceso vascular (AV) es una dimensión subjetiva, pero clínicamente relevante en la hemodíalisis (HD), que influye en la imagen corporal, la autoestima y la adhesión al tratamiento. La *Hemodialysis Arteriovenous Access Cosmesis Scale* (AVACS) es el único instrumento conocido que evalúa esta percepción estética.

**Objetivo:** Traducción, adaptación cultural, validez de contenido, prueba preliminar y validez aparente de la AVACS al portugués europeo.

**Metodología:** Estudio metodológico realizado en tres fases: (1) traducción y adaptación cultural; (2) evaluación de la validez de contenido con 14 expertos; (3) prueba preliminar con 20 pacientes y 20 profesionales, y evaluación de la validez aparente mediante entrevistas semiestructuradas.

**Resultados:** La *Hemodialysis Arteriovenous Access Cosmesis Scale* – versión portuguesa (AVACS-PT) alcanzó la equivalencia lingüística con la versión original. Los ítems presentaron un índice de validez de contenido  $\geq 0,80$  y un coeficiente Kappa excelente. La prueba preliminar y la validez aparente demostraron la claridad, la pertinencia y la aplicabilidad clínica de la AVACS-PT.

**Conclusión:** La AVACS-PT es lingüística y culturalmente equivalente, clara y válida para evaluar la estética del AV arteriovenoso en pacientes en HD en Portugal.

**Palabras clave:** fistula arteriovenosa; diálisis renal; imagen corporal; estudios de validación; cuestionarios; medidas de resultados informados por el paciente

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## Introduction

Chronic kidney disease (CKD) is highly prevalent worldwide, affecting over 10% of the population — approximately 800 million people (Kovesdy, 2022). As CKD progresses to end-stage renal disease, renal replacement therapies (RRT), particularly hemodialysis (HD), become essential. In Portugal, the prevalence of CKD requiring RRT is among the highest in Europe, exceeding 2,000 cases per million people (Galvão, 2024). Effective vascular access (VA) is critical to the success of HD; arteriovenous fistulas (AVFs) are preferred for HD due to their lower rates of thrombosis and infection, as well as their better clinical outcomes, compared to other forms of VA (Aitken et al., 2025). However, the use of AVFs, which result from surgery and punctures with two large-gauge needles (with a total of 300 punctures annually to perform HD), leads to the formation of multiple scars and/or deformities (Aitken et al., 2025; Al-Jaishi et al., 2017; Valenti et al., 2014).

Beyond the clinical challenges, it is important to consider the repercussions of VA on body image perception. Body image, defined as one's perception of their physical appearance, significantly impacts a patient's psychological well-being (Sharif Nia et al., 2022). Visible changes, such as scars and aneurysmal dilations, serve as persistent reminders of the disease and can trigger anxiety, fear, and reduced self-esteem (Casey et al., 2014). The aesthetic aspect of VA, referred to as cosmesis, is an emerging area of research with limited existing literature (Woo et al., 2022; Yuo et al., 2022).

The Hemodialysis Arteriovenous Access Cosmesis Scale (AVACS), developed in 2022, comprehensively assesses the VA's cosmetic impact on individuals undergoing HD (Yuo et al., 2022). Given HD's high prevalence in Portugal, the negative impact of arteriovenous VA, and the lack of specific instruments to assess cosmesis, this study aimed to translate, culturally adapt, and assess the content validity and face validity of the AVACS.

## Background

Body image is a particularly vulnerable domain for people with CKD (Cash, 2004; Sharif Nia et al., 2022), as visible physical changes can affect how the body is perceived and integrated into personal identity (Muringai et al., 2008; Sevil & Gökçe, 2020). In the context of HD, the VA is particularly significant, as its visibility makes it a constant marker of CKD. Casey et al. (2014) found that the VA is perceived as a painful reminder of the body's limitations and dependence on the machine for survival, contributing to feelings of abnormality, fragility, and loss of identity. Beyond its functional implications, the VA is a physical intrusion that causes scarring and deformities, compromises body image, and affects the emotional, social, and relational life of people with CKD.

In this context, a cosmesis is defined as the preservation or alteration of the limb's physical appearance after the surgical creation of the VA, constituting a subjective

yet clinically relevant dimension of the HD patient's experience (Yuo et al., 2022). Despite its recognized impact, the assessment of cosmesis remains limited in HD studies, where only a minority include patient-reported outcomes, and these are rarely related to appearance (Barros et al., 2023). Instruments such as the VASQoL, VAQ, SF-VAQ, and HARQ include only one or a few questions on this topic, which prevents a comprehensive assessment of the aesthetic experience associated with the VA (Quinn et al., 2008; Nordyke et al., 2020; Richarz et al., 2023). The AVACS, developed through a Delphi process involving HD experts and patients, is the only patient-reported outcome measure specifically designed to assess the cosmesis of VA. The instrument incorporates two dimensions: a clinician component, which is completed by healthcare professionals, and a patient component, which is completed by the patient and covers aspects such as scarring, skin discoloration, aneurysmal deformities, and emotional impact (Yuo et al., 2022). Therefore, validating the AVACS for European Portuguese is essential to deepening our understanding of the cosmetic impact of VA on the national population and supporting interventions that improve the quality of life (QoL) of individuals on HD.

## Research question

What are the content validity and face validity of the AVACS when translated and culturally adapted for the Portuguese population on HD with arteriovenous VA?

## Methodology

This is a methodological study on the translation, cultural adaptation, and validation of an instrument that is part of the project "Translation, Cultural Adaptation, and Validation of the Hemodialysis Arteriovenous Access Cosmesis Scale into European Portuguese," which was approved by the Ethics Committee of the Coimbra Local Health Unit (ULS) (194/25 CE\_06/2025). Following the recommendations of the COnsensus-based Standards for the selection of health Measurement INstruments (COSMIN; Gagnier et al., 2025), the study included three main stages: (i) translation and cultural adaptation, (ii) content validity assessment, and (iii) pretesting and face validity assessment.

### Phase 1: Translation and cultural adaptation into European Portuguese

The translation of the AVACS began after the authors granted permission for its use. The linguistic validation adhered to the principles of best practices in translation and cultural and linguistic adaptation proposed by Beaton et al. (2000), as outlined in Table 1.

**Table 1***Stages of the translation and cultural and linguistic adaptation process for the AVACS*

|                                                 |                                                                                                                  |
|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| Stage 1: Initial translation                    | Two independent translations by bilingual translators who are native Portuguese speakers.                        |
| Stage 2: Synthesis of the translations          | Consolidation of the translated versions in agreement with the researcher.                                       |
| Stage 3: Back translation                       | Independent back translation into the original language without access to the original version.                  |
| Stage 4: Expert panel                           | Review by a panel of 14 experts to ensure linguistic and cultural equivalence.                                   |
| Stage 5: Pre-final version testing              | Administration of the pre-final version to 40 participants from the target population, followed by an interview. |
| Stage 6: Submission of the scale to the authors | Submission of the final version to the authors.                                                                  |

*Note.* AVACS = Hemodialysis Arteriovenous Access Cosmesis Scale.

**Phase 2: Content validity**

Fourteen experts were invited to participate in this panel and selected based on the following criteria: a) university professor; b) interventional nephrologist; c) hemodialysis unit nurse manager; and d) VA nurse manager. After receiving a formal invitation via email, all of the experts agreed to join the panel, resulting in a 100% acceptance rate. Between April and May 2024, two rounds of evaluation and consensus building were conducted. In each round, the experts received a concordance questionnaire via email in Google Forms® format, designed to assess the degree of agreement between the original version and the translated version of the AVACS.

At the end of each round, the content validity index (CVI) was calculated, and the convergences and discrepancies in the experts' comments and suggestions were analyzed. These contributions were reviewed and evaluated again to ensure continuous refinement and validation of the instrument.

**Phase 3: Pretesting and face validity**

The pilot test of both components of the AVACS-PT was conducted from June 16 to July 16, 2025, using a questionnaire that covered the following areas: content clarity and comprehension, organization and formatting, relevance of the information, clinical applicability and ease of response, and overall evaluation.

For healthcare professionals, the questionnaire also included the practical applicability of the scale and any barriers to its use. For patients, the questionnaire placed particular emphasis on ease of response.

Face validity of the AVACS-PT was assessed using a convenience sample of patients and healthcare professionals in the field from the Nephrology Department's HD Unit at the Coimbra ULS. The study included individuals with arteriovenous VA in the upper limbs who were 18 years of age or older. Those with cognitive impairment and limitations in verbal communication were excluded. Regarding healthcare professionals, those with clinical experience in HD were included. Staff members without direct contact with HD patients or duties related to VA assessment or maintenance were excluded. The researchers used a semi-structured interview guide with three open-ended questions tailored to the clinical and

patient components (e.g., "Do you consider the existence of this clinician component important/necessary for assessing the aesthetic impact of vascular access?"; "What did you like most about the clinician component of the AVACS-PT instrument?"; "In your opinion, do the items and response options in the patient component of the AVACS-PT adequately assess the construct of cosmesis (aesthetic impact) of the arteriovenous vascular access?"). The interviews took place in person in a private room at the HD Unit to ensure privacy and comfort. They lasted an average of 10 minutes per participant.

The first author contacted the service and presented the study, including its objectives and participant eligibility criteria, while the second author conducted participant selection and data collection. After providing information about the study and obtaining written informed consent, the pretest questionnaires were distributed. Participants were asked to return the questionnaires in sealed envelopes. The interviews were conducted in person by members of the research team (first and second authors).

**Data analysis**

**Content validity:** After the translation and cultural adaptation of the AVACS scale, two methods were used to assess content validity. First, the item-level CVI (I-CVI) was calculated, with a minimum required agreement of 80% for validation. Second, the scale-level CVI (S-CVI) was calculated, considering the average of the items (S-CVI/average variance extracted [AVE]), with a value of S-CVI/AVE  $\geq 0.9$  considered excellent. Other statistical measures were analyzed in addition to the CVI calculation, including the probability of chance agreement (Pc) and the Kappa coefficient (K), which is classified as good when between 0.60 and 0.74 and excellent when higher than 0.74 (Polit & Beck, 2006).

**Pretest:** Quantitative data were analyzed using descriptive statistics (absolute frequency, percentage, mean, standard deviation, and minimum and maximum values).

**Face validity:** A content analysis of the interviews was conducted by the first author after full transcription, following Bardin's (2016) methodology. This process included the following stages: pre-analysis (skimming and defining units of analysis), exploration of the material (coding and categorizing independently by the first and

second authors), and treatment of the results and inference (interpretation and thematic synthesis). During this analysis, discrepancies were reviewed by the third author and the remaining authors.

## Results

The translation and cultural adaptation phases ensured the semantic and linguistic equivalence between the AVACS-PT and the original version. Now that this process is complete, the results regarding content validity, pretesting, and face validity are presented below.

### Content validity

Consensus was reached at the end of the second round, following a reevaluation of items with a CVI < 0.80 (Table 2). The title, items, and instructions had an I-CVI of 1, a Pc of 0, and a K of 1. In the clinician component, items 1 and 7 had a CVI below 0.80 in the first round. After being reformulated, all items achieved a CVI  $\geq$  0.80, with a low Pc and an excellent K. In the patient component, items 3 and 5 had a CVI < 0.8 in the first round. After being revised, all items exceeded 0.80, with a predominance of a CVI of 1 and an excellent K. The S-CVI values for the AVACS-PT clinician and patient components were 0.89 and 0.953, respectively (Tables 2 and 3).

**Table 2**

*Content validity index, probability of chance agreement, and Kappa coefficient – clinician component*

| AVACS-PT – Clinician component                                                                                                                  | CVI   | Pc      | K    | Interpretation |
|-------------------------------------------------------------------------------------------------------------------------------------------------|-------|---------|------|----------------|
| 1) Quantas cicatrizes de procedimentos/cirurgias (não relacionadas com a canulação) o paciente apresenta no acesso vascular atual?              | 0.857 | 0.0056  | 0.86 | Excellent      |
| 2) Qual é o comprimento da cicatriz de procedimentos/cirurgias mais longa (não relacionada com a canulação) associada ao acesso vascular atual? | 0.857 | 0.0056  | 0.86 | Excellent      |
| 3) Qual é a largura da cicatriz de procedimentos/cirurgias mais larga (não relacionada com a canulação) associada ao acesso vascular atual?     | 0.857 | 0.0056  | 0.86 | Excellent      |
| 4) Qual o relevo da cicatriz de procedimentos/cirurgias mais proeminente (não relacionada com a canulação) associada ao acesso vascular atual?  | 0.857 | 0.0056  | 0.86 | Excellent      |
| 5) Nota alguma descoloração da pele (hiperpigmentação ou hipopigmentação) associada à cicatriz resultante da criação do acesso vascular atual?  | 0.929 | 0.00094 | 0.93 | Excellent      |
| 6) Nota alguma descoloração da pele (hiperpigmentação ou hipopigmentação) ou cicatrizes nos locais de canulação do acesso vascular atual?       | 0.929 | 0.00094 | 0.93 | Excellent      |
| 7) O acesso vascular atual apresenta uma dilatação global ou uma apresentação tipo “mega-fístula”?                                              | 0.929 | 0.00094 | 0.93 | Excellent      |
| 8) Quantos pseudoaneurismas ou aneurismas focais estão associados ao acesso vascular atual?                                                     | 0.929 | 0.00094 | 0.93 | Excellent      |
| 9) Qual é a largura do pseudoaneurisma ou aneurisma focal mais largo associado ao acesso vascular atual?                                        | 0.857 | 0.0056  | 0.86 | Excellent      |

**S-CVI/AVE = 0.889**

*Note.* AVACS-PT = Hemodialysis Arteriovenous Access Cosmesis Scale – Portuguese Version. CVI = Content validity index; S-CVI/AVE = average variance extracted; Pc = Probability of chance agreement; K = modified Kappa coefficient.

**Table 3***Content validity index, probability of chance agreement, and Kappa coefficient – patient component*

| AVACS-PT – Patient component                                                                                                                              | CVI   | Pc      | K    | Interpretation |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-------|---------|------|----------------|
| 1) A aparência física do seu acesso vascular atual influencia negativamente a sua decisão sobre qualquer futuro acesso vascular do qual possa necessitar? | 1.0   | 0.0001  | 1    | Excellent      |
| 2) Com que frequência a aparência física do seu acesso vascular atual interfere com as suas atividades profissionais ou de lazer regulares?               | 0.857 | 0.0056  | 0.86 | Excellent      |
| 3) Evita usar certos tipos de roupa ou tenta disfarçar o seu acesso vascular atual devido à sua aparência?                                                | 1.0   | 0.0001  | 1    | Excellent      |
| 4) Sente-se inseguro(a) ou menos atraente devido à aparência física do seu acesso vascular atual?                                                         | 0.929 | 0.00094 | 0.93 | Excellent      |
| 5) A aparência física do seu acesso vascular atual tem um impacto emocionalmente negativo em si?                                                          | 1.0   | 0.0001  | 1    | Excellent      |
| 6) Como classificaria a aparência geral do seu acesso vascular atual?                                                                                     | 0.929 | 0.00094 | 0.93 | Excellent      |
| <b>S-CVI/AVE = 0.953</b>                                                                                                                                  |       |         |      |                |

*Note.* AVACS-PT = Hemodialysis Arteriovenous Access Cosmesis Scale – Portuguese Version CVI = Content validity index; S-CVI/AVE = average variance extracted; Pc = Probability of chance agreement; K = kappa coefficient.

### Pretesting and face validity

The two components of the preliminary version of the AVACS-PT were pretested with individuals from the target population, which confirmed that the items were understood and interpreted correctly.

### Pretesting data

Twenty healthcare professionals with experience in HD participated in the clinician component. Their mean age was 42.5 years, and most were male (55%). Academically, 55% held a master's degree, while 45% held a bachelor's degree. In terms of professional experience, 70% had practiced for more than 10 years, 20% for fewer than 5 years, and 10% for between 5 and 10 years. Half of the participants were nurses, and the other half were physicians. The evaluation of the instrument revealed high acceptability: 95% of participants found the clinician component clear and easy to understand, although one participant had difficulty distinguishing between some questions and suggested a digital version with images and clearer wording between similar items. Regarding design and presentation, 95% gave positive ratings, with only a suggestion for a single-page layout; all considered the font size adequate. All professionals recognized the clinical relevance of the items, although one professional found the instrument to be too detailed. Seven participants suggested including additional parameters, such as edema, discoloration of the extremities, indirect signs, such as distal hypoperfusion and central venous stenosis, and the person's aesthetic perception. Regarding barriers to clinical application, 80% did not identify any obstacles, while 20% noted potential difficulties, such as patient resistance, health illiteracy, lack of accountability in care, and possible lack of adherence among professionals. The overall evaluation was positive: 35% rated it as excellent,

45% as very good, 15% as good, and 5% as insufficient. The final suggestions that stood out were the inclusion of visible VA complications and the reformulation of redundant items.

Twenty individuals with arteriovenous VAs participated in the patient component, with a mean age of 63.45 years and mostly male (60%). The average duration of HD was 31.35 months. Regarding employment status, 60% were retired, 30% were employed, and 10% were unemployed. Most participants had an VA in the proximal region of the upper limb (65%), followed by the distal region (30%). In 5% of cases, participants were unable to identify the location. The VA was located in the dominant arm in 45% of cases and in the non-dominant arm in 50% of cases (5% were unable to specify). A proportion of 25% reported a previous VA failure, and most had only one VA in the upper limb at the time of the study. Regarding the instrument's evaluation, 95% of participants found the content clear and understandable, although one participant reported language difficulties and suggested more understandable terms. All participants found the layout of the information and font size to be appropriate. Everyone acknowledged that the questions reflected the impact of the VA on their lives. Two participants suggested including items on self-care. Ninety percent reported no difficulties when completing the questionnaire, but two participants noted the need for support from a professional or caregiver, which reinforces the importance of simpler language. The overall evaluation was positive: 10% rated it as excellent, 45% as very good, 35% as good, and 10% as fair.

### Content analysis data

The lead author transcribed the interviews in full for the content analysis, following Bardin's (2016) methodology.

Two researchers performed inductive coding and discussed discrepancies until reaching consensus. Categories emerged through successive thematic aggregation and formed the basis for presenting the results.

Five main categories emerged from the content analysis of the interviews with healthcare professionals and are presented below: (i) Clinical relevance/utility, with broad agreement on the need for a clinician component that makes the aesthetic impact of the VA visible and supports decision-making, highlighting the monitoring of aneurysmal dilation, scar appearance, and other skin signs (“First, concern about the aesthetic impact is set aside in the creation and use of the VA. The instrument under test can facilitate an assessment centered on this topic” (C1); (ii) Adequacy and clarity of the items, considered high ( $n = 19$ ), with clear and accessible language, a simple and easy-to-read structure, and objective questions and answers that are easy to complete and replicate (“The items and response options adequately assess the cosmesis of the VA, allowing a focus on essential and visible aspects”) (C3); (iii) Scope of the cosmesis construct, generally perceived as satisfactory for covering determining factors (e.g., aneurysms, scars, and visible changes) and their psychosocial expression, although with suggestions for improvement to enhance clinical precision, namely by specifying the anatomical location of the VA and adding a reference to the pre-HD period (“clear and precise assessment of the VA’s appearance, such as aneurysms and the state of the post-surgical scar”) (C3); (iv) Acceptability and experience of response, generally high, with the instrument being valued for its operational simplicity and only one professional reporting difficulty in distinguishing between some items (“A short questionnaire, quick to read, easy to complete and replicate”) (C5); and (v) Psychosocial and care implications, with the instrument recognized for its contribution to a person-centered approach, respect for dignity and individuality, the possibility of screening for psychological distress, and support for prioritizing interventions, particularly relevant in younger and more active patients (“This relationship between the VA’s visual impact and outcomes is essential in interpreting the patient’s perception of treatment”) (C6).

Five main categories emerged from the content analysis of the patient interviews, which are presented below: (i) Clinical relevance/utility, recognized by the majority ( $n = 14$ ), who valued the instrument for making aesthetic concerns visible and guiding interventions (“It is very important for the HD patient to be able to cope with the disease without constraints and as naturally as possible”) (P1), in contrast to a participant who downplayed its importance (“It depends on the person’s mindset”) (P2); (ii) Adequacy and clarity of the items, with formulations considered understandable and requiring no reformulation (“The questions are, in my view, appropriate”) (P4); (iii) Scope of the cosmesis construct, with reference to self-image, self-esteem, and QoL, despite interindividual variation in the meaning attributed to aesthetics (“It is important to know each person’s opinion and how it influences our self-esteem and quality of life” (P10); “otherwise, the patient might not feel as comfortable expressing this

to their doctor or nurse” (P16); (iv) Acceptability and experience of response, with no reports of discomfort, fatigue, or difficulties in selecting options

I think the best way to assess the impact that a fistula has on the life of a HD patient is to ask them how they cope with this reality on a daily basis, asking the appropriate questions for that purpose and, last but not least, drawing conclusions aimed at mitigating the aesthetic impact in daily life, namely by developing new techniques and equipment (P6);

and (v) Psychosocial and care implications, with the understanding that aesthetic satisfaction is associated with overall well-being and can support more tailored care (“Aesthetic satisfaction brings overall satisfaction and gives more confidence to live with the disease”) (P1). Overall, the data show high agreement regarding the clarity, relevance, and comprehensiveness of the AVACS-PT in capturing the aesthetic dimension of AV among healthcare professionals and HD patients. There were a few cases of difficulty completing the questionnaire ( $n = 2$  patients) and distinguishing between items ( $n = 1$  professional). Suggestions for improvement mainly focused on using simpler language, providing visual examples, offering a digital format, and making some items more anatomically specific. Overall, the five categories identified were consistently observed in both groups, which gave mostly positive evaluations of the instrument.

## Discussion

This study aimed to translate, culturally adapt, and validate the Portuguese version of the AVACS-PT scale for individuals with arteriovenous VA undergoing HD in Portugal. The translation and adaptation process strictly adhered to the methodological guidelines recommended by Beaton et al. (2000). These procedures ensured that the Portuguese version achieved semantic and conceptual equivalence with the original scale, an indispensable condition given the subjective nature of the cosmesis construct (aesthetic perception) and its cultural sensitivity. Careful linguistic adaptation, validation of the terms used, and expert participation throughout the process ensured the final version’s linguistic faithfulness and cultural appropriateness. The clarity and ease of application of the resulting scale confirm that it is understandable and relevant to the Portuguese clinical reality, making it a valuable tool for assessing the cosmesis of VA in HD patients (Beaton et al., 2000).

According to the COSMIN group’s recommendations, content validity is the most important measurement property of an instrument because it ensures that the items are relevant, comprehensive, and understandable for the construct and target population being assessed (Gagnier et al., 2025). In this study, a panel of 14 experts—a number exceeding the generally suggested minimum of 5–10 experts for this type of analysis—conducted the content validity assessment, which reinforces the robustness of this step. The results showed high agreement among the evaluators: all AVACS-PT items had a CVI  $\geq 0.80$ , and

the overall mean CCI values were classified as excellent, as were the Kappa coefficients. It is important to note that the experts provided mainly grammatical and semantic comments, leading to only minor adjustments in the wording of some items. These results suggest that the Portuguese version, AVACS-PT, accurately reflects the cosmesis construct in the context of HD, with items that are conceptually relevant, culturally appropriate, and easily understandable for patients and healthcare professionals. In summary, the AVACS-PT demonstrated strong content validity, meeting expectations for a rigorously developed instrument (Gagnier et al., 2025).

The AVACS-PT pretest, conducted with HD patients and healthcare professionals, confirmed the instrument's acceptability and clinical applicability. In the clinician component, nurses and physicians noted the clarity of the items and deemed the scale applicable to HD services in Portugal. However, the professionals suggested minor improvements, such as including additional details (anatomical location of the AV or the presence of visible complications, such as aneurysms or skin changes), as they recognized that these factors can influence the aesthetic and functional perception of the VA. From a clinical perspective, these aspects are relevant. The literature indicates that certain VA locations can affect patient satisfaction in specific domains (e.g., concerns about function or social activities), and visible complications are associated with greater dissatisfaction with appearance and a negative psychosocial impact (Ahrabi et al., 2025). Indeed, the VA for HD has been described as a mark on the body that transcends its physical significance and can carry emotional implications for kidney patients (Muringai et al., 2008). A recent meta-analysis yielded similar observations, highlighting that patients' satisfaction with their VA depends not only on clinical functionality but also on aesthetic perception and its influence on body image and social life (Ahrabi et al., 2025). Thus, although the professionals' suggestions were not included as formal items in the final version of the scale, they were incorporated into the application instructions to increase the instrument's clinical sensitivity. This approach aligns with published evidence emphasizing that the success of a VA is measured by technical criteria and patient comfort and satisfaction (Ahrabi et al., 2025). The pretest results thus validated the clinical utility of the AVACS-PT and confirmed the importance of considering aesthetic and psychosocial factors in the overall VA assessment.

From the patients' perspective, there was unanimous recognition of the importance of assessing the cosmesis of VA, underscoring the need to integrate this aspect into care for people on HD. Participants in the pretest reported that the scale was, for the most part, clear and easy to understand and addressed important concerns that they experience. These results are consistent with those of recent studies. A negative perception of one's VA is associated with poorer emotional well-being, greater impairment in social relationships, and difficulties in daily activities, resulting in significantly lower QoL (Ahrabi et al., 2025; Sikora et al., 2024). Similarly, in our study, patients valued being able to express the aesthetic impact

of VA on their daily lives through the AVACS-PT. Although a minority of patients suggested simplifying the language of some items or mentioned needing assistance to complete the questionnaire, such observations indicate opportunities to improve the instrument's accessibility, especially for people with lower literacy levels. Overall, however, patients' positive reaction to the AVACS-PT confirms the relevance of the cosmesis dimension and suggests that systematically incorporating the assessment of aesthetic perception of VA could fill an important gap in patient-centered care.

The face validity of the AVACS-PT was examined through semi-structured interviews, and the findings confirmed the instrument's suitability and practicality. Patients reported that the scale is appropriate, clear, and sensitive to their reality, stating that they identify with the content of the items and feel that their aesthetic concerns are represented. In turn, healthcare professionals valued the organized structure and objectivity of the instrument, highlighting its potential to improve the clinical approach to VA and communication with patients regarding this often-neglected topic. These results align with recent recommendations to include measures sensitive to the aesthetic dimension as a strategy to humanize care in this context (Ahrabi et al., 2025). In other words, by addressing aesthetic perceptions and the psychosocial impact of VA, the AVACS-PT promotes more comprehensive care for HD patients by addressing not only the technical aspects of therapy but also its implications for self-image and personal dignity. The strong face validity observed from the perspectives of both patients and professionals indicates that the AVACS-PT is a comprehensible, acceptable, and useful tool in clinical practice, capable of capturing an often-underestimated dimension of HD care. One noteworthy aspect of the results was the discrepancy between the assessments of the scale's quality by patients and healthcare professionals. Among patients, 45% rated the AVACS-PT as "Very Good" and 35% as "Good", reflecting the clarity, relevance, and representativeness they perceived in the scale in relation to their subjective experience with the VA. Among professionals, however, 45% rated the scale as "Very Good" and 35% as "Excellent", although a small proportion (about 5%) rated it as "Insufficient". This difference in perceptions may reflect distinct perspectives. For patients, the AVACS-PT fulfilled the need to express how VA affects their daily lives and body image, thus highlighting its practical and human dimensions. Healthcare professionals, on the other hand, tend to adopt a more technical and demanding perspective. Some expressed the expectation that the scale include clinical indicators, such as specific complications, that they typically consider when assessing VA. Rather than weakening the instrument, this complementarity of perspectives reinforces the relevance of the AVACS-PT: the scale captures aspects important to patients that professionals might traditionally prioritize (Ahrabi et al., 2025), thereby promoting an enriching dialogue. In fact, the literature shows that, historically, decisions regarding VA in HD primarily reflected the professionals' perspective, but there is a shift toward more patient-cen-

tered recommendations that recognize the importance of QoL and patient satisfaction when evaluating VA options (Ahrabi et al., 2025). Therefore, integrating both perspectives—the patient’s and the clinician’s—is essential in developing assessment tools such as the AVACS-PT and in implementing them in clinical practice, ensuring that VA management is technically effective and sensitive to patients’ concerns and well-being.

This study has some limitations that should be acknowledged. First, the sampling method was non-probability and limited to a single HD center, which may have restricted the diversity of participants and consequently the generalizability of the results to other populations or contexts. Future studies should involve multiple centers and broader, more heterogeneous samples to strengthen the external validity of the results. Second, this research focused on the content and face validity of the AVACS-PT. While these are fundamental steps in instrument development (as emphasized by COSMIN) and have been robustly demonstrated here, other psychometric properties must be evaluated. In particular, construct validity, internal consistency, and test-retest reliability require further study. Third, the VA’s “cosmesis” construct is complex and has not been well-explored in the context of kidney patients. This was reflected in the interviews being less in-depth in some cases, which limited the richness of the content analysis. Future research using more extensive qualitative approaches could deepen our understanding of this aesthetic dimension and its impact on patients’ lives, providing insights to further refine the scale. Finally, it should be noted that, until now, no published content of face validity studies existed for the original version of the AVACS, making it impossible to directly compare our results with previous evidence from the original scale. Therefore, future studies should include multicenter and longitudinal designs to confirm the measurement properties evaluated here and examine the AVACS-PT’s performance in terms of convergent validity with other QoL measures, reproducibility across different time points, and predictive capacity (for example, whether the aesthetic perception of the VA is associated with objective indicators of adherence or clinical outcomes). In conclusion, despite the aforementioned limitations, this study is a solid initial contribution because it provides a validated Portuguese version of the AVACS and highlights the importance of incorporating the assessment of VA cosmesis into healthcare for patients undergoing HD.

## Conclusion

The AVACS-PT was found to be linguistically equivalent to the original version. All items in both components had a CVI of at least 0.80. Pretest and face validity results indicate that both components of the AVACS-PT reflect and assess the construct under study. The instrument is useful, easy to understand, and easy to apply. It is the first tool in Portugal specifically designed to assess the cosmesis of arteriovenous VAs in HD, integrating patient-reported perception and clinical assessment.

Using the AVACS-PT can support person-centered decision-making and highlight an often-overlooked aspect of VAs. Future research should test the multicenter and longitudinal applicability of the AVACS-PT to establish it as a reference instrument in HD clinical practice and research.

## Author contributions

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