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Translation, cultural adaptation, and validation of the Venous International Assessment Scale to European Portuguese

Tradução, adaptação cultural e validação da Venous International Assessment Scale para português europeu

Traducción, adaptación cultural y validación de la escala Venous International Assessment al portugués europeo

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Abstract

Background: A significant number of adult patients experience difficult peripheral intravenous access, leading to multiple puncture attempts and venous network depletion. The Venous International Assessment (VIA) Scale is referenced internationally as a reliable instrument that classifies patients' peripheral intravenous accesses and determines the risk of related complications.

Objectives: To translate, culturally adapt and validate the VIA Scale to European Portuguese.

Methodology: Study of the translation, cultural adaptation, and evaluation of the psychometric properties of the VIA Scale in a nonprobability sample with 100 patients in need of peripheral intravenous catheterization.

Results: The Portuguese version of the VIA Scale (EARV) revealed moderate inter-rater reliability scores ($k = 0.490$; $p < 0.0005$). The criterion and construct validity of the EARV were assessed through predictive, convergent, and correlational analysis, with moderate to large magnitudes, and statistical significance.

Conclusion: The EARV is a reliable and valid instrument that can assist Portuguese health professionals in determining and categorizing difficult peripheral intravenous access. Further studies are recommended to test the transversal applicability of the scale.

Keywords: catheterization, peripheral; translations; psychometrics; nurses

Resumo

Enquadramento: Um número significativo de pessoas adultas tem um acesso venoso periférico difícil, o que leva a múltiplas tentativas de punção e ao esgotamento da rede venosa. A escala *Venous International Assessment* (VIA) é considerada a nível internacional como um instrumento fiável que classifica as vias de acesso venoso periférico das pessoas e determina o risco de complicações associadas.

Objetivos: Traduzir, adaptar culturalmente e validar a Escala VIA para português europeu.

Metodologia: Estudo da tradução, adaptação cultural, e avaliação das propriedades psicométricas da escala VIA em amostra não probabilística de 100 pessoas doentes a precisar de cateterização venosa periférica.

Resultados: A versão em português europeu da escala VIA (EARV) revelou valores moderados de fiabilidade inter-observadores ($k = 0,490$; $p < 0,0005$). As validades do critério e do constructo da EARV foram avaliadas através de análise preditiva, convergente e correlacional, com magnitudes moderadas a grandes e significância estatística.

Conclusão: A EARV é um instrumento fiável e válido que pode ajudar os profissionais de saúde portugueses na determinação e categorização de acessos venosos periféricos difíceis. Contudo, recomenda-se a realização de mais estudos para testar a aplicabilidade transversal desta escala.

Palavras-chave: cateterismo periférico; traduções; psicométrica; enfermeiros e enfermeiras

Resumen

Marco contextual: Un número significativo de adultos experimenta dificultades al ser sometido a un acceso venoso periférico, lo que provoca múltiples intentos de punción y el deterioro de la red venosa. La escala *Venous International Assessment* (VIA) está considerada internacionalmente como un instrumento fiable que clasifica los accesos venosos periféricos en las personas y determina el riesgo de complicaciones relacionadas.

Objetivos: Traducir, adaptar culturalmente y validar la escala VIA al portugués europeo.

Metodología: Estudio de traducción, adaptación cultural y evaluación de las propiedades psicométricas de la escala VIA en una muestra no probabilística con 100 personas que necesitan ser sometidos a un cateterismo venoso periférico.

Resultados: La versión portuguesa desarrollada de la escala VIA (EARV) mostró puntuaciones de concordancia entre evaluadores moderadas ($k = 0,490$; $p < 0,0005$). La validez de criterio y de constructo de la EARV se evaluó mediante un análisis predictivo, convergente y correlacional, con magnitudes de moderadas a amplias y significación estadística.

Conclusión: La EARV es un instrumento fiable y válido que puede ayudar a los profesionales sanitarios portugueses a determinar y categorizar la dificultad de un acceso venoso periférico. Se necesita realizar futuros estudios para comprobar la aplicabilidad transversal de la escala.

Palabras clave: cateterismo periférico; traducciones, psicométrica; enfermeras y enfermeros



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Introduction

The peripheral intravenous catheter (PIVC) is the most used vascular access device worldwide, with conservative estimates indicating that about 1.2 billion catheters are inserted each year (Alexandrou et al., 2015; Carr et al., 2019). However, the insertion of a PIVC can be deemed difficult in 12-26% of adult patients (Sabri et al., 2013), with consecutive puncture attempts that lead to peripheral intravenous network depletion. Thus, obtaining a first-time successful PIVC insertion must be considered a clinical priority (Carr et al., 2019).

Recently, in a systematic review with meta-analysis, Rodríguez-Calero et al. (2020) identified several risk factors associated with difficult peripheral intravenous access, such as demographic and anthropometric variables (gender, body mass index), health conditions (diabetes, renal insufficiency, parenteral drug abuse, chemotherapy), and vascular access-related variables (ability to observe and palpate a vein, vein diameter, history of difficult catheterization).

Nonetheless, variability in first-time insertion success rates for PIVCs may also be explained by the absence of uniform assessment approaches (Carr et al., 2017). Although several tools have been developed in this scope (Carr et al., 2017), the multifactorial nature of PIVC-related success may reduce the ability of single objective measures to identify patients with difficult peripheral vascular access (Rippey et al., 2016).

International literature identifies the Venous International Assessment (VIA) Scale as a simple and fast to use tool, which allows health professionals to classify the patient's peripheral venous network in five grades based on three parameters: i) the number of observable puncture points; ii) optimal PIVC size and ease to perform venipuncture; iii) risk of extravasation or phlebitis (Torre-Montero et al., 2014).

Given the lack of such an assessment tool in Portugal,

this study aims to translate, culturally adapt and validate the VIA Scale to European Portuguese.

Background

Clinical nurses have a primary role in recognizing the risk of difficult peripheral intravenous access, ensuring that all patients are assessed for conditions associated with this phenomenon before attempting a PIVC insertion (Moureau, 2019; Pagnutti et al., 2016).

Current studies developed in Portugal suggest that nurses require between two to eight puncture attempts to successfully insert a PIVC in 19.4-23.7% of adult hospitalized patients (Braga, 2017; Oliveira et al., 2019; Parreira et al., 2019). This number reportedly increases to a mean of five puncture attempts per patient (ranging between one to 20 attempts) when considering the entire period of treatment (Braga, 2017).

This unacceptably high number contradicts current standards of care in vascular access and intravenous therapy, which recommend up to a maximum of two attempts per nurse (aided by vein-locating technologies such as ultrasound and near-infrared light devices), with consequential referral to expert clinicians/vascular access team if peripheral access is not obtained (Infusion Nurses Society, 2016; Moureau, 2019; Royal College of Nursing, 2016). However, such considerations may not be directly applicable in Portugal, given the lack of existing intrahospital vascular access teams and recurrent use of vein-locating technologies for PIVC insertion.

Recognizing the importance of developing and implementing reliable tools that aid clinicians in the assessment of the peripheral venous network, Torre-Montero et al. (2014, p. 45) introduced the VIA Scale as a "performance status tool" of the peripheral venous network, composed of five grades (Table 1).

Table 1

Overview of the VIA Scale grades

VIA scale	Possible puncture points (at least)	Catheter caliber (at least)	Extravasation risk	Venipuncture performance	IV medicine status
Grade I	6	18G	Remote	Very easy	Can run fast and resistance-free
Grade II	4	20G	Low	Easy	Resistance
Grade III	3	22G	Possible	Not Easy	Tendency in prolonged infusion
Grade IV	1	24G	High	Difficult	Easy to reach
Grade V	0	No real possibilities	Very High	Very difficult	Very easy to reach

Note. VIA = Venous International Assessment; IV = intravenous. Source: Torre-Montero et al. (2014, p. 46).

The VIA Scale comprehensively acknowledges the multifactorial nature of difficult peripheral vascular access (Rippey et al., 2016) by considering both the experiential (e.g., right catheter gauge size) and procedural dimensions (palpation of a venous pathway after tourniquet application) involved in PIVC insertion.

In addition to supporting professionals in selecting an optimal puncture point and appropriate catheter gauge, the VIA Scale also identifies the potential risk of PIVC-related complications such as extravasation and phlebitis. Thus, the VIA Scale can be universally used across clinical settings (Torre-Montero et al., 2014).

Research question

Is the European Portuguese version of the VIA Scale valid and clinically feasible for assessing the degree of difficulty in peripheral intravenous access in the Portuguese population?

Methodology

This methodological study is developed in two phases: i) translation and cultural adaptation of the VIA Scale to European Portuguese; ii) psychometric validation of the adapted version.

The first phase was conducted according to Beaton et al.'s (2000) guidelines for the process of cross-cultural adaptation of self-report measures, comprising of six stages. In stage I (Initial Translation), four reviewers from different scientific backgrounds (nursing, psychology, and biomedical laboratory sciences), all native in European Portuguese, assessed and translated the VIA Scale. Next, the research team and the reviewers analyzed and discussed the four translations, originating an α version (stage II – Synthesis of the Translations). The α version was then back-translated by two official translators whose native language is English (stage III – Back translation). Both translations were reviewed by the research team, which confirmed the linguistic equivalence to the original VIA Scale.

In stage IV (Expert Committee), an expert panel with experience in vascular access (four Ph.D. nurses and two medical doctors) assessed and reviewed the α version. During the first round of consensus, significant changes were suggested to ensure that semantical and experiential equivalence was achieved (e.g., *ponto* was changed to *local de punção*). The suggestion to translate the name of the VIA Scale to *Escala de Avaliação da Rede Venosa* (EARV) was also made in the first round. All involved experts unanimously agreed with it. After a second round, the reformulated scale was assessed once more, and all items achieved a concordance index of 85% between experts. Following Beaton et al.'s (2000) guidelines for stage V (Test of the Prefinal Version), between November and December 2019, nurses ($n = 30$) from a surgical ward in central Portugal were requested to score the EARV before inserting a PIVC. Globally, nurses considered that the

EARV's description of the five grades was understandable and did not indicate any difficulties in scoring it. In the sixth stage, the outcomes of each stage were compiled and sent to the original author of the scale, who approved the final version of the EARV.

A prospective observational study was carried out in a surgical ward from an oncology hospital in Portugal to conduct the psychometric validation of the EARV (phase two) between December 2019 and July 2020. The lead researcher presented the study and its objectives to the nursing team, obtaining their voluntary and informed consent. Of the 26 nurses involved in this phase, most were women (78.6%), with a mean age of 39.3 ± 8.2 years and a mean professional experience of 17.5 ± 8.5 years, of which 14.2 ± 8.6 were in the oncology ward. Moreover, 10.7% of the nurses held a 3-year degree (*bacharelato*), 64.3% had a bachelor's degree, and 17.9% had a master's degree. In addition, 21.4% of the nurses were specialists in areas such as medical-surgical nursing (10.7%), mental health and psychiatric nursing (7.1%), and child health nursing and pediatrics (3.8%). All participating nurses had previous experience in PIVC insertion.

Following Boateng et al.'s (2018) recommendations, a minimum of 10 participants per scale item is necessary to assess its properties. Given the single-item nature of the EARV, we initially proposed to enroll 100 patients. Patient recruitment followed a non-probability consecutive sampling technique until the required sample size was achieved. Patients' selection criteria were to be over 18 years of age, to be able to provide informed consent, and to be scheduled to return to the same ward after surgery. Patients with peripheral venous system damage, known intravenous drug addiction, and scheduled to be transferred to another unit after the planned surgical procedure were excluded from the study.

Two nurses simultaneously assessed each patient's peripheral venous network before PIVC insertion by first applying a tourniquet 5-10 cm above the antecubital fossa and then observing and palpating vein trajectories. After this, both nurses independently scored the EARV without discussing their rationale. Next, the nurse responsible for the patient inserted a short peripheral intravenous catheter into the selected puncture point. A puncture attempt was defined as a percutaneous needle puncture, regardless of subcutaneous progression. Intravenous catheterization was considered successful if the practitioner was able to inject a 0.9% sodium chloride flush without signs of infiltration. Several variables were collected throughout the study, including patient-related variables (e.g., age, visible vein diameter in millimeters, body mass index, previous antineoplastic treatment), procedure-related outcomes (e.g., PIVC caliber, time for catheter insertion in minutes, first-attempt success, number of puncture attempts, complications), nurse-reported ease of puncture (in *Likert* scale format, between 1 – *not at all difficult* and 7 – *extremely difficult*), and the total score in the European Portuguese version of the modified A-DIVA scale (Santos-Costa, Sousa, van Loon, et al., 2020). This study was approved by the hospital's Ethics Committee (ref. TI 24/2019).

Data were analyzed using the IBM SPSS Statistics, version 25.0, and a descriptive analysis was performed to provide an overall understanding of patient- and PIVC-related variables. In addition, given the single-item categorial nature of the EARV, interrater reliability was calculated through Fleiss' kappa since two independent nurses were randomly selected at each time (Landis & Koch, 1977). The criterion and construct validity of the scale were assessed following Boateng et al.'s recommendations (2018). Thus, Pearson's correlation coefficient (r) was used to determine the strength of association between the scores and continuous variables of the EARV. In contrast, the point biserial correlation coefficient (r_{pb}) was used for independent dichotomous variables identified in the literature as hypothetically associated with intravenous access difficulties (Rodríguez-Calero et al., 2020). Pearson's correlation was used to determine the strength of association between the scores of the EARV and the European Portuguese version of the Modified A-DIVA scale (convergent validity). Given

the main parameters of the original VIA Scale, an enter multiple regression analysis was carried out to establish the predictive magnitude of the indicators on the variability of the scale's score. A 5% level of significance ($\alpha = 0.05$) was determined for all necessary analyses.

Results

The translation and cultural adaptation process of the VIA Scale to European Portuguese showed satisfactory results, with all items achieving a concordance index of 85% in the expert consensus rounds (Phase I – Stage IV). However, the original author of the VIA Scale suggested a clearer definition of what was intended as a puncture point (*local de punção*). This description was clarified in an initial user instructions section of the scale, mirroring the original VIA Scale. Table 2 presents the final proposed version of the EARV.

Table 2

The proposed version of the EARV

Grau 1
<ol style="list-style-type: none"> Existem, pelo menos, seis locais ótimos de punção numa das veias dorsais da mão, veia cefálica e/ou basilica do antebraço. Estas veias devem ser palpáveis e visíveis. Estas veias permitem a inserção de um cateter de maior calibre, de pelo menos 18G, e apresentam características para uma punção venosa isenta de riscos. O risco de extravasamento é pouco provável. Há a possibilidade remota de ocorrência de flebite.
Grau 2
<ol style="list-style-type: none"> Existem, pelo menos, quatro locais ótimos de punção numa das veias dorsais da mão, veia cefálica e/ou basilica do antebraço. Baixa dificuldade na inserção de cateteres de maior calibre, pelo menos 20G, e facilidade na obtenção de amostras de sangue. O risco de extravasamento é baixo a possível. Existe a possibilidade de ocorrência de flebite e poderá ser encontrada resistência na administração de terapêutica intravenosa.
Grau 3
<ol style="list-style-type: none"> Existem, pelo menos, três locais ótimos de punção numa das veias dorsais da mão, veia cefálica e/ou basilica do antebraço. Dificuldade na inserção de cateteres de menor calibre (22G e 24G), sem possibilidade de inserção de cateteres de maior calibre, acima de 20G. A obtenção de amostras de sangue não é fácil. O risco de extravasamento é possível. Há possibilidade de ocorrência de flebite e poderá aumentar o tempo necessário para administração da terapêutica intravenosa.
Grau 4
<ol style="list-style-type: none"> Existe, pelo menos, um local ótimo de punção numa das veias dorsais da mão, veia cefálica e/ou basilica do antebraço. Grande dificuldade na inserção de cateteres de menor calibre (24G e inferiores); dificuldade na obtenção de amostras de sangue. O risco de extravasamento é elevado. Facilidade de ocorrência de flebite após administração de terapêutica intravenosa.
Grau 5
<ol style="list-style-type: none"> Não existem locais ótimos de punção numa das veias dorsais da mão, veia cefálica e/ou basilica do antebraço. Impossibilidade de inserção de cateteres de menor calibre (24G e inferiores); elevada dificuldade na obtenção de amostras de sangue. O risco de extravasamento é extremamente elevado. Muito facilmente irá ocorrer flebite após administração de terapêutica intravenosa.

Overall, 83% of the patients required a PIVC insertion due to an impending surgery, while 12% had a previous non-functioning catheter (Table 3). Nurses mainly opted for the veins in the back of the hand (59%) and forearm (32%), selecting mostly 20G PIVCs (79%). Successful

PIVC insertion was achieved after a mean of 1.57 attempts (1-8, $SD \pm 1.1$). The PIVC remained *in situ* for 2.1 days (0-8, $SD \pm 1.4$). Throughout the study, a complication rate of 26% was recorded, mainly due to infiltration (18%) and phlebitis (9%).

Table 3

Demographic and clinical characteristics of study participants (n = 100)

Demographic and clinical variables	Patients' characteristics
Age	63.4 years (28 - 92; $SD \pm 14.2$)
Gender	
Male	8%
Female	92%
Comorbidities	
Type 2 Diabetes Mellitus	16%
Arterial Hypertension	44%
Dyslipidemia	16%
Smoker	8%
Previous cancer treatment	
Chemotherapy	24%
Radiotherapy	2%
Hormone Therapy	2%
None	74%
Body Mass Index (kg/m²)	
Below 18.5	5%
18.5 – 24.9	26%
25.0 – 29.9	49%
30.0 and above	17%
Missing	3%

The EARV scores were distributed asymmetrically, with a mean score of 2.2 (1-5, $SD \pm 1.1$). Regarding inter-rater reliability, Fleiss' kappa showed that there was moderate agreement between the nurses' judgements (Landis & Koch, 1977), $k = .490$ (95% CI, 0.371 to 0.610), $p < 0.0005$.

Total scores obtained were correlated with procedural

and patient-related variables identified in the literature as hypothetically associated with intravenous access difficulties to assess the criterion and construct validity of the EARV (Table 4). Moreover, the obtained EARV scores were also correlated with PIVC-related outcomes (e.g., phlebitis and infiltration), given the scale's focus on potential complications, which lead to early PIVC removal.

Table 4*Correlation matrix for the EARV scale (n = 200)*

	Variables	r / r _{pb}	p-value
Patient-related variables	Age	.139	.049
	Gender	.067	.343
	Body Mass Index (overall)	.149*	.035
	Visible vein diameter (in millimeters)	-.485**	.000
	Previous antineoplastic treatment	.095	.180
	Comorbidities: Arterial Hypertension	.095	.182
	Comorbidities: Dyslipidemia	-.074	.299
	Comorbidities: Type-2 Diabetes	.173	.014
Procedural variables	Caliber (Gauge)	.467	.000
	Insertion site: hand	-.083	.243
	Insertion site: forearm	.002	.980
	Insertion site: antecubital fossa	.157	.027
	First-attempt success	.501	.000
	Number of puncture attempts	.533	.000
PIVC outcomes	Time for PIVC insertion (in minutes)	.097	.172
	Ease of puncture	.682	.000
	Premature removal	.354	.000
	Complication: infiltration	.037	.604
	Complication: phlebitis	.086	.224
	Complications (overall)	.261	.000

A point-biserial correlation was run to determine the relationship between the scores of the A-DM and EARV scales. There was a positive correlation between both scales considered statistically significant ($r_{pb} = 0.739$, $p < 0.001$). An enter multiple regression analysis was carried out to establish the predictive magnitude of the number of puncture attempts, PIVC caliber, nurse-reported ease of puncture, and visible vein diameter on the variability of the scale's score to deepen the estimation of the EARV's validity based on the variables explored in the original VIA Scale.

Residuals were independent, as assessed by a Durbin-Watson statistic of 2.048. No outliers were identified. As assessed by visual inspection of a plot of standardized residuals versus standardized predicted values, data homoscedasticity was verified. Residuals were normally distributed as assessed by visual inspection of a normal probability plot. The four variables statistically and significantly predicted the EARV's score, $F(4,95) = 46,518$, $p < 0.001$, $R^2 = 0.648$. All four variables added statistical significance to the prediction (Table 5).

Table 5*Coefficients from the Enter multiple regression analysis*

Model	B	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B	
		Std. Error	Beta				Lower Bound	Upper Bound
1	(Constant)	0.231	0.658		0.351	0.726	-1.076	1.538
	Number of puncture attempts	0.202	0.063	0.224	3.222	0.002	0.077	0.326
	Caliber (Gauge)	0.394	0.146	0.179	2.688	0.008	0.103	0.685
	Ease of puncture	0.236	0.037	0.461	6.313	0.000	0.162	0.311
	Visible vein diameter (in millimeters)	-0.195	0.057	-0.225	-3.399	0.001	-0.309	-0.081

Thus, the number of puncture attempts, PIVC caliber (gauge), ease of puncture, and visible vein diameter (in millimeters) accounted for 66.2% of the variation in EARV's scores with adjusted $R^2 = 0.648$, a large size effect according to Cohen (1968).

Discussion

The involvement of translators and experts from different scientific backgrounds (nursing, medicine, and biomedical laboratory sciences) was deemed extremely important to produce a local version easily understandable by different clinicians across clinical sites. Likewise, the involvement of two English-Portuguese official translators in stage III was relevant to ensure that the EARV had semantic and idiomatic equivalence to the original VIA Scale.

Strict compliance with the stages proposed by Beaton et al. (2000) resulted in the development of a translated and culturally adapted scale for the Portuguese population, with potential clinical applicability, proven by the high level of agreement between experts ($\geq 85\%$) and positive feedback from the nurses involved in its assessment.

Scale validity is the extent to which “an instrument indeed measures the latent dimension or construct it was developed to evaluate” (Boateng et al., 2018, p.13). According to the authors, validity can be assessed through criterion and construct validity. Regarding criterion validity, the predictive validity of the EARV was assessed through its ability to predict PIVC-related complications, given the scale's risk assessment of extravasation or phlebitis. The EARV correlated with PIVC-related complications with a magnitude of 0.247 and a significance level of 0.05. However, given the lack of an internationally recognized gold standard in this field, concurrent validity could not be assessed.

Construct validity was assessed through convergent and correlational analysis. The EARV and Modified A-DIVA scales were applied simultaneously to assess difficult peripheral intravenous access, given that both scales aim to measure the same construct (Torre-Montero et al., 2014; Santos-Costa, Sousa, van Loon, et al., 2020). The EARV correlated significantly with the Modified A-DIVA scale scores ($p < 0.001$) with a magnitude of 0.739, attesting to its convergent validity.

Several correlation analyses were conducted to quantify further the EARV's validity (Boateng et al., 2018). For example, the EARV correlated significantly with vein diameter and PIVC caliber, both assessed in its grading description and described extensively in the literature as factors that influence first-attempt success (Carr et al., 2019; Rodríguez-Calero et al., 2020). Likewise, nurse-reported ease of puncture, first-attempt success, and the number of puncture attempts needed for PIVC insertion also correlated significantly with the EARV scores, with considerable magnitude levels between 0.467 and 0.682, demonstrating that the scale can indicate potential difficulty in peripheral intravenous access.

According to Boateng et al. (2018, p. 14), scale validity is “supported if at least two of the different forms of

construct validity . . . have been examined”. In this study, the EARV's different validity dimensions were assessed through predictive, convergent, and correlational analysis, with satisfactory results. However, study limitations must be addressed, such as the non-probability consecutive sampling technique used to recruit participants from a specific clinical setting. Further validation studies in different clinical sites and involving specific patient cohorts are recommended to attest to the transversal applicability of the EARV. Although this study was one of the first to assess the survival times of PIVCs after an initial assessment with a scale (Carr et al., 2017), larger studies are needed to explore further the EARV's predictive nature concerning PIVC-related complications. Future validation studies with the EARV should also be conducted in clinical sites where ultrasound, near-infrared light, or electrical stimulation devices are used to detect and select peripheral venous access. Such studies will likely contribute to developing recommendations that inform health professionals when a vein-locating technology is highly recommended, given the assessed EARV grade. Nevertheless, the EARV can be considered as a reliable and valid contribution to clinical practice, contributing to standardizing the initial assessment of the patient's peripheral venous network and identifying difficult peripheral venous accesses (Moureau, 2019).

Although in Portugal nurses are the health professionals primarily responsible for PIVC insertion and management (Santos-Costa, Sousa, Marques, et al., 2020), we believe that the EARV can assist any health professional with skills in vascular access in selecting an optimal site for catheterization and the right PIVC caliber to vein size, factors that are associated with a higher chance of first-time insertion success in peripheral intravenous catheterization (Carr et al., 2019; Rodríguez-Calero et al., 2020). Thus, it is expected that the adoption of the EARV in Portuguese clinical settings may decrease known rates of first-attempt failure and need for multiple insertion attempts (Braga, 2017; Oliveira et al., 2019; Parreira et al., 2019). Likewise, given its predictive nature, the EARV allows health professionals' early monitoring of PIVC-related complications, significantly contributing to intravenous treatment quality and patients' safety and well-being. The EARV can also contribute to standardizing the terminology used to describe difficult peripheral venous access in clinical practice, contributing to the vascular access-related continuity of care and clinical record keeping in Portugal.

Conclusions

The EARV demonstrated linguistic equivalence to the VIA Scale. The translation and cultural adaptation process obtained positive feedback from clinical practice nurses and the original author of the scale. The psychometric testing of the EARV revealed significant reliability and validity indicators, which further attest to its potential contribution to clinical practice in Portugal. Nevertheless, further validation studies should be carried, especially in different clinical cohorts and settings with larger samples.

Author contributions

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