

Adaptation of the caffrey cultural competence health services in nursing students in Lima, Peru

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Abstract

Background: In the Peruvian context, cultural sensitivity and awareness among healthcare professionals are essential due to the country's multicultural nature. To strengthen nursing education, reliable instruments are needed to assess perceived knowledge, self-awareness, and cultural competence.

Purpose: The aim of this study was to adapt the *Caffrey Cultural Competence* in Healthcare Scale for nursing students at a private university in Lima.

Methods: The sample consisted of 246 nursing students in the final academic terms. The adaptation process followed international guidelines for translation and back-translation, with expert committee review achieving 100% agreement on semantic and conceptual equivalence. Data were collected through an online survey and analyzed using descriptive statistics, confirmatory factor analysis, and internal reliability estimation with McDonald's Omega coefficient.

Results: Fit indices were optimal for both the five-factor model (Comparative Fit Index = .991; Tucker-Lewis Index = .990; Root Mean Square Error of Approximation = .021) and the unifactorial model (Comparative Fit Index = .992; Tucker-Lewis Index = .991; Root Mean Square Error of Approximation = .020), with evidence favoring the latter due to its greater parsimony. Reliability analysis showed excellent values for the total score and the Knowledge dimension, adequate values for Comfort/Proximity, moderate values for Comfort/Distance and Awareness, and lower consistency for the National Policies dimension.

Conclusion: The scale demonstrates structural validity and adequate reliability for its application among nursing students in Lima, representing a relevant contribution to the evaluation of cultural competence in diverse educational contexts.

Keywords: cultural competency; nursing students; psychometrics.

Introduction

In recent decades, nursing has been consolidated as a cross-disciplinary field within health systems, integrating knowledge and practices into a comprehensive model of care. The recent health crisis caused by the SARS-CoV-2 virus reinforced this role, placing nursing at the frontline of defense against the pandemic (da Silva et al., 2021).

Beyond technical foundations, nursing professionals require competencies that enable them to address individual and sociocultural variables that influence care. In this context, cultural competence allows for care adapted to the specific cultural characteristics and variations of individuals, respecting their customs and reducing sociocultural barriers that may affect the effectiveness of interventions, ensuring that procedures are adjusted to the patient rather than the patient to the procedure. Recent evidence confirms that the development of cultural competencies in nursing strengthens the therapeutic relationship and improves care quality (Martin et al., 2025), and that cultural factors such as community collaboration, family ties, and spiritual beliefs are determinants of intervention effectiveness and patient well-being in low- and middle-income countries (Cipta et al., 2024).

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At the international level, globalization and migration have prioritized cultural competence training in nursing. However, evidence published in Spanish-speaking countries remains limited, with greater development in Spain and scarce implementation in Latin America (El-Messoudi et al., 2023). A recent review identified systematic evaluation of undergraduate nursing students as a key strategy to improve cultural competence (Shopo et al., 2025).

In Peru, recent health policies have promoted the adaptation of health services under criteria of cultural relevance, aiming to ensure care that respects and adapts to the sociocultural diversity of the population (Ministerio de Salud del Perú (MINSA), 2024). Nevertheless, training in cultural competencies remains limited. A study conducted with healthcare professionals in rural service revealed that curricula do not foster the development of these competencies, creating difficulties in interacting within culturally diverse contexts (Agurto, 2022). These findings reinforce the need for valid instruments to evaluate and strengthen cultural competence from university training.

A recent systematic review identified 21 instruments to measure cultural competence in nursing, concluding that most present psychometric limitations and recommending not the development of new scales but the adaptation and strengthening of existing ones (Osmancevic et al., 2021). In this scenario, instruments with solid theoretical foundations and international validation are required to systematically assess cultural competence in nursing.

The Caffrey Cultural Competence in Healthcare Scale (CCCHS) was developed in 2005 to evaluate cultural competence in students and healthcare professionals, based on Wells' theoretical model (2000). This model conceives cultural competence as the result of two learning processes: the acquisition of knowledge -from ignorance to cultural awareness- and the change in attitude and behavior -from sensitivity to competence in multicultural settings- supporting the structure of the instrument and its applicability in nursing education.

Unlike other scales that focus on specific perceptions or cultural self-efficacy, the CCCHS offers a solid theoretical framework, a balanced structure, and evidence of sensitivity to change. Its relatively brief design facilitates application in academic settings, and its international validations demonstrate versatility and consistency. These characteristics make it a particularly useful tool for evaluating cultural competence in nursing students.

The importance of the CCCHS lies in its ability to systematically measure students' progression toward cultural competence, providing useful information to design educational strategies that integrate cultural sensitivity into curricula. Its incorporation into nursing classes facilitates the identification of areas for improvement and promotes training more aligned with the needs

of culturally diverse populations. Furthermore, recent studies have demonstrated the usefulness of the CCCHS in educational contexts, employing it to evaluate the impact of pedagogical strategies such as cultural simulation in nursing students. Findings confirm that the instrument can measure significant improvements in cultural competence after training interventions, reinforcing its relevance for integration into curricula (Kang et al., 2020; Kaur, 2025; McElfish et al., 2018). In this context, the aim of the present study was to adapt and validate the CCCHS in nursing students at a private university in Lima, in order to provide a reliable and relevant instrument to evaluate cultural competence in the Peruvian context.

Materials and Methods

Design

This is a quantitative, observational, cross-sectional, and instrumental study aimed at the cultural adaptation and psychometric validation of the Cultural Competence Health Services (CCCHS) scale in nursing students.

Sample and setting

The sample size was 246 students from a Faculty of Nursing of a private university in Lima in the last academic cycles between men (n=9, 3.659%) and women (n=237, 96.341%) and an age range of 21 to 29 years (M=25.020, SD=2.607, U=858, p=.318). In addition, 34.416% of the participants had less than 1 year of pre-professional experience related to their career (n=84) compared to 65.854% with 1 year or more (n=162). Along the same lines, in the category of "Opportunity to meet patients from different cultures", participants indicated "often" (n=96, 39.024%), "never" (n=80, 32.520%), and "sometimes" (n=70, 28.455%).

The selection of participants was carried out through non-probabilistic convenience sampling, considering that nursing students in the final academic terms have greater exposure to pre-professional practice and, therefore, increased potential contact with patients from diverse cultural backgrounds. The invitation to participate was managed through academic authorities, who distributed the online form via institutional platforms. Participation was voluntary, and confidentiality and informed consent were ensured prior to completing the questionnaire. This population was chosen because it represents the group closest to the transition into professional practice, where cultural competence is critical for the quality of healthcare delivery.

The selection criteria used are (a) regular enrollment in the last two academic semesters, (b) not being in the period of remedial courses, (c) 21 to 29 years old, (d) at least 1 month of experience in pre-professional practice, and (e) verbal and explicit agreement with the informed consent.

Variable

The main variable was cultural competence in health services, assessed through the CCCHS scale, which comprises five dimensions (knowledge, convenience/proximity, comfort/distal, awareness, and national conscience/policies). In addition, sociodemographic variables were collected to characterize the sample: age, sex, pre-professional experience, and opportunity for contact with patients from diverse cultures.

Instruments

The Caffrey Cultural Competence Health Services (CCCHS) was developed by Caffrey et al. (2005) to measure perceived knowledge, self-awareness, and fit with cultural competencies in healthcare settings. It is composed of 28 items with a five-point Likert response style where 1 reflects total disagreement and 5 represents total agreement. In relation to its structure, evidence of validity in a sample of nursing students identified that there are five dimensions: knowledge, comfort-proximal, comfort-distal, awareness, and awareness of national policy. Reliability indices by Cronbach's α ranged from .90 to .97.

Subsequently, Noji et al. (2017) analyzed the evidence of validity and reliability of the instrument in a nursing sample. Regarding validity, they identified that the five-factor model explains 62.31% of the variance through exploratory factor analysis (EFA). Then, they established the fit of the five dimensions by confirmatory factor analysis (CFA) and obtained acceptable indices (RMSEA=.058, 90% CI: .057 - .059, TLI=.891, CFI=.903, SRMR=.059). The internal consistency reliability ranged from .76 to .90, considered acceptable.

Intervention

The instrument was translated according to the guidelines developed by Ramada-Rodilla et al. (2013). This procedure is consistent with recent methodological recommendations on cross-cultural adaptation in health sciences (Cruchinho et al., 2024). In the first instance, the scale was translated from the original version into Spanish by two Peruvian bilingual translators and the synthesis version was agreed upon. In the second instance, the Spanish version was back-translated into English by two independently certified translators, and the English version was agreed upon in a meeting. In the third instance, the English version was compared with the original version by structuring a committee composed of a bilingual nurse and a methodologist fluent in both languages to evaluate the semantic equivalence between the versions, and the percentage of agreement equivalent to 100% was analyzed. In the last instance, the original version was analyzed, translated, and back-translated by all the professionals involved in all the phases to corroborate that the linguistic adaptation, grammatical construction, and vocabulary of the items are understandable for the target population.

Data collection

The virtual survey was used for the remote and automated collection of information in the sample selected for this study. The authorities of the institution were contacted to explain the rationale of the study highlighting the confidentiality, security, and benefits during the entire data collection process, and to request that the forms developed in Google be distributed in their virtual platforms. The data were collected in the period from October 2022 to February 2023.

Data analysis

The cases were transferred to a Microsoft Excel spreadsheet for quality control. The descriptive variables were analyzed by means of the mean (M), standard deviation (SD), coefficient of variation (CV), skewness (g_1), Kurtosis (g_2), and item-test correlation (r_{it}). Confirmatory factor analysis was performed using robust maximum likelihood estimation method (MLR) optimized for five response styles (Rhemtulla et al., 2012; Rogers, 2024). Model fit was estimated using the comparative fit index (CFI), Tucker-Lewis index (TLI), root mean squared error of approximation (RMSEA) with 95% confidence intervals and normalized root mean square (SRMR), and Akaike's index of criterion (AIC) to test four models: 5-factor oblique, 5-factor orthogonal, unidimensionality and direct hierarchical or bifactor, cut-off points of optimal adjusted to the following values were highlighted: CFI >0.95, TLI >0.95, RMSEA <.06, SRMR <.05 (Browne & Cudeck, 1992; Hu & Bentler, 1999). On the other hand, the lower the AIC index, the better the fit of the data to the proposed model. Reliability was analyzed for internal consistency by means of the Ω coefficient (Flora, 2020; Green & Yang, 2009).

The software used was Microsoft Excel and the R program, managed through the R studio user interface in addition to the function libraries "lavaan", "semTools", "psych", "mvn" and "ggplot2".

Ethical consideration

The ethical principles contained in the Declaration of Helsinki were followed throughout the study design process (Manzini, 2000) and the guidelines of the code of ethics of the Peruvian College of Nurses. In addition, in accordance with the nature of the administration of the instruments, the ethical guidelines for Internet-mediated research were considered (Dominguez-Lara & Torres-Villalobos, 2021).

Results

Table 1 showed that the coefficients of variation ranged from 23.7% to 38.4%, representing relative variability of the data with respect to their central tendency, the skewness and kurtosis values were in an acceptable range [-2; +2] and the relationship indexes were statistically significant and direct.

Table 2 showed that the 1-factor model (CFI=.992;

Table 1. Descriptive analysis of the CCCHS reagents

Reagents	M	SD	CV	g_1	g_2	r_{it}
Knowledge						
i2	3.736	1.361	0.364	-0.883	-0.496	.882
i3	3.748	1.341	0.358	-0.904	-0.404	.867
i4	3.736	1.287	0.345	-0.874	-0.364	.860
i5	3.740	1.363	0.365	-0.855	-0.579	.882
i6	3.382	1.294	0.383	-0.376	-0.852	.773
i7	3.707	1.292	0.348	-0.860	-0.403	.869
i15	3.768	1.235	0.328	-0.887	-0.217	.852
i16	3.740	1.28	0.342	-0.904	-0.265	.857
i17	3.772	1.238	0.328	-0.927	-0.102	.843
Convenience / Proximity						
i20	3.533	1.037	0.293	0.123	-1.173	.603
i21	3.508	1.013	0.289	0.108	-1.094	.625
i22	3.557	0.987	0.278	0.136	-1.061	.572
i23	3.610	1.039	0.288	0.023	-1.213	.662
i24	3.537	0.996	0.282	0.086	-1.061	.647
Comfort/Distal						
i1	2.675	0.948	0.354	-0.062	-0.968	.380
i8	2.699	0.934	0.346	-0.093	-0.928	.436
i9	2.638	0.975	0.369	-0.021	-1.040	.482
i10	2.691	0.909	0.338	-0.071	-0.860	.345
i13	2.756	0.963	0.350	-0.295	-0.874	.447
i14	2.764	0.918	0.332	-0.186	-0.857	.333
Awareness						
i11	2.744	0.954	0.348	-0.235	-0.897	.456
i12	2.772	0.929	0.335	-0.117	-0.984	.393
i18	2.715	1.042	0.384	-0.172	-1.188	.413
i19	2.707	0.950	0.351	-0.220	-0.872	.379
National Conscience/Policies						
i25	3.748	0.927	0.247	-0.129	-0.929	.285
i26	3.667	0.868	0.237	-0.052	-0.719	.277
i27	3.793	0.978	0.258	-0.286	-0.962	.339
i28	3.732	0.961	0.258	-0.163	-0.981	.312

Source: Own elaboration

Table 2. Fit indices of the proposed CCCHS models

Models	χ^2	SRMR	IFC	TLI	RMSEA	IC 95%		AIC
						LI	LS	
Oblique - 5 factors	378.473	.033	0.991	0.990	0.021	.000	.033	16330.193
Orthogonal - 5 factors	1432.859	.365	0.740	0.719	0.112	.106	.118	17355.222
1 factor	382.931	.033	0.992	0.991	0.020	.000	.031	16315.616
Bifactor	343.251	.031	0.995	0.994	0.016	.000	.030	16330.522

Table 3. Internal consistency reliability analysis of the CCCHS scores

Dimensions	Ω	95% CI	
		LI	LS
Knowledge	.966	.960	.972
Convenience/Proximity	.827	.793	.861
Comfort/Distal	.679	.617	.741
Awareness	.632	.557	.707
National Conscience/Policies	.516	.417	.615
Total	.964	.957	.970

TLI=.991; RMSEA=.020) and five correlated factors (CFI=.991; TLI=.990; RMSEA=.021) had optimal fit indices with evidence in favor of the unifactorial model (AIC=16315.616).

Figure 1 identified the factor structure of the five-factor oblique model whose factor loadings for each dimension were acceptable ($\lambda > .30$). In the knowledge dimension its values ranged from .786 to .902; in conformity/proximal they were .665 to .714; conformity/distinct was .474 to .554; awareness ranged from .453 to .635; and awareness of national policies, .324 to .475. Covariances between the latent variables were also observed.

In Table 3, it was identified that the dimensions "knowledge" and "comfort/proximity" obtained "optimal" reliability indexes. On the other hand, the dimensions "comfort/distal", "awareness" and "awareness/national policies" had "acceptable" indices ($.50 < \Omega < .70$).

Discussion

Cultural and Linguistic Adaptation

This study followed the guidelines of Ramada-Rodilla et al. (2013) for the cultural adaptation of the CCCHS, consistent with internationally recognized recommendations for cross-cultural adaptation (Beaton et al., 2000; Guillemin et al., 1993). These protocols include, in addition to direct translation, synthesis, back-translation, and expert committee review, a pre-test phase with end users. Although the pre-test phase was not conducted in the present study -a methodological limitation, since it allows for evaluating item performance and detecting potential comprehension difficulties- the consensus among judges was 100%, ensuring semantic and conceptual equivalence of the items. Subsequent psychometric validation provided evidence of the instrument's structure and reliability in the studied population. Beyond this limitation, it is important to note that the cultural adaptation framework implemented in this research remains valid and has been applied in recent nursing studies (Graeff et al., 2022; Jalali et al., 2024). In conclusion, this study was conducted in accordance with established guidelines for cultural adaptation, ensuring semantic and conceptual equivalence of the items, and providing a reliable framework for application among nursing students in culturally diverse contexts.

Evidence of Structural Variability

Although the Caffrey Cultural Competence in Healthcare Scale (CCCHS) has been used in various studies as a reference instrument, only two investigations directly evaluated its psychometric properties: Noji et al. (2017) in Japan and Sattler et al. (2018) in the United States. These works therefore represent the most relevant and recent points of comparison for contrasting the findings of the present study. Results showed optimal fit indices for both the unifactorial model and the correlated five-factor model, with evidence favoring the former due to its greater parsimony. These findings coincide with those reported by Sattler, who identified a unifactorial model among health professions students, and differ from Noji, who primarily confirmed the five-factor structure.

Sample characteristics help explain this variability. Noji worked with more than 7,000 practicing nurses with extensive experience caring for foreign patients, which favored differentiation into five factors. In contrast, Sattler included 105 students from various health professions in international immersion programs and found a unifactorial model. This study, with 246 nursing students in Lima and heterogeneous levels of pre-professional experience and cultural exposure, also favored the parsimony of the unifactorial solution, suggesting that in training contexts cultural competence may be perceived as a global construct (Goretzko et al., 2021; Nájera et al., 2025).

In the present study, different models (unidimensional, orthogonal, oblique, hierarchical, and bifactor) were systematically contrasted without forcing statistical modifications. This strategy allowed for a broader evaluation of parsimony and interpretability, showing consistent evidence in favor of the unifactorial model in the Latin American context. However, interpretation of unidimensionality should be made with caution, as it was not possible to precisely determine the proportion of variance attributable to the general factor versus specific dimensions. Although the bifactor model did not yield interpretable solutions, this finding itself constitutes relevant evidence, consistent with literature on its limitations (Reise, 2012; Rodriguez et al., 2016). More recently, Gegenfurtner (2022) showed that its performance is particularly sensitive to sample size, number of items, and factorial complexity.

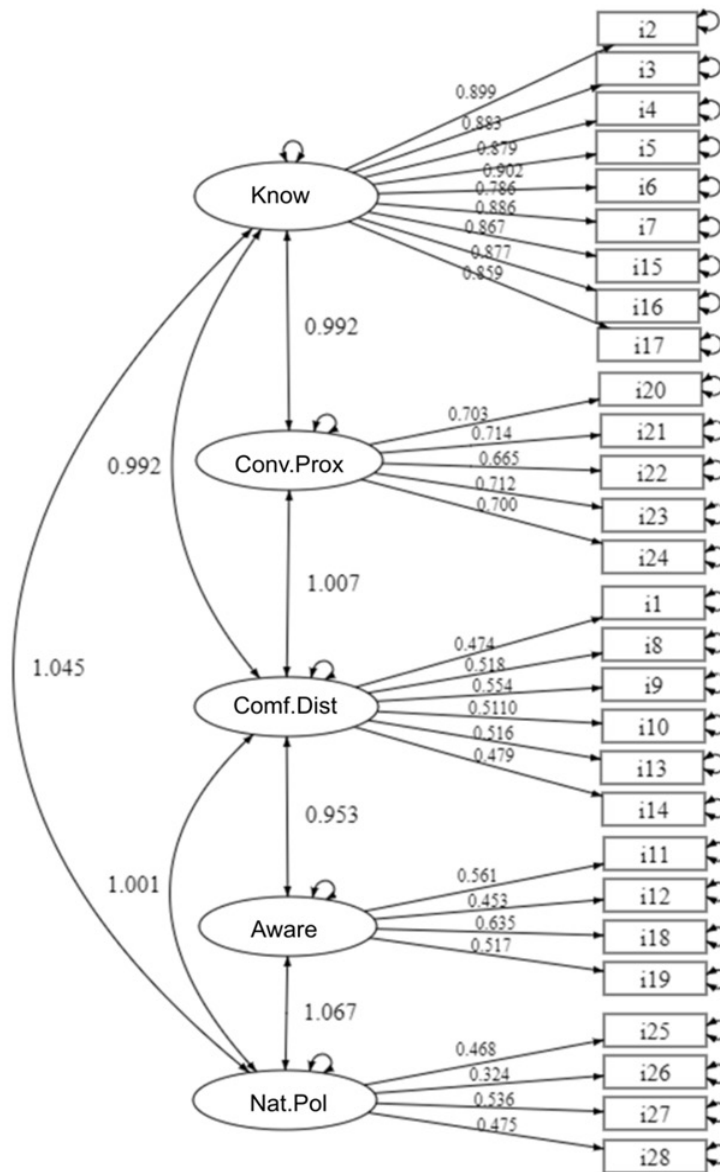


Figure 1. Five-dimensional structural model of the CCCHS

Taken together, these results reinforce the need to validate the CCCHS in different cultural contexts, as dimensionality may vary according to population characteristics and training environments.

Evidence of Reliability

Internal consistency analysis using McDonald's Omega coefficient showed excellent reliability for the total CCCHS score ($\Omega = .964$, 95% CI .957–.970) and for the Knowledge dimension ($\Omega = .966$, 95% CI .960–.972). The Comfort/Proximity

dimension reached adequate values ($\Omega = .827$, 95% CI .793–.861), while Comfort/Distance ($\Omega = .679$, 95% CI .617–.741) and Awareness ($\Omega = .632$, 95% CI .557–.707) presented moderate reliability. The Awareness/National Policies dimension obtained the lowest value ($\Omega = .516$, 95% CI .417–.615), confirming its relative fragility in the instrument's structure.

Reliability results are consistent with those reported in previous studies. Noji et al. (2017) found a global Cronbach's Alpha of .94 among nurses, with

adequate values in most dimensions, though with lower consistency in national policy items. Similarly, Sattler et al. (2018) reported a global Alpha of .94 among health professions students, confirming the instrument's high reliability in training contexts. In the present study, the Omega coefficient replicated the global consistency observed in both works, but also highlighted the relative fragility of the national policies dimension.

This pattern of high global reliability and lower consistency in specific dimensions coincides with literature on the measurement of complex constructs in cross-cultural contexts (Fischer et al., 2025; Kusano et al., 2025). Overall, the findings suggest that the CCCHS is a reliable instrument for evaluating cultural competence in nursing students, although certain dimensions require critical review in future adaptations.

This study presents some limitations that should be considered when interpreting the results. First, the pre-test phase with end users was not conducted, which would have allowed identification of potential comprehension difficulties in the practical application of items. Likewise, sample size constitutes a limitation for inferring the factorial structure with greater precision, and the absence of detailed stratification of analysis groups restricts generalization of findings. Finally, the lower consistency observed in the National Policies dimension suggests the need for critical review of this subscale in future cross-cultural adaptations.

Future studies are encouraged to use sampling calculation procedures based on structural equation modeling and to implement measurement invariance to determine score equivalence across subgroups and corroborate the instrument's metric properties among nursing professionals. In addition, it would be pertinent to evaluate temporal stability of scores through test-retest reliability and to replicate validation in other Latin American contexts, in order to confirm dimensionality and strengthen the applicability of the CCCHS in diverse educational and clinical settings.

Conclusion

The Caffrey Cultural Competence in Healthcare Scale (CCCHS) demonstrated adequate validity and reliability indices among nursing students at a private university in Lima, confirming its relevance for evaluating cultural competence in the Peruvian context. The results support both the unidimensional interpretation -as a global measure of cultural competence- and the five-factor structure, providing flexibility for its application in research and teaching.

This study represents a pioneering contribution in Latin America by offering novel evidence on the adaptation and validation of the CCCHS in a Spanish-speaking country. The availability of a reliable and culturally relevant instrument opens the possibility of strengthening university training in cultural competence and promoting comparative

research in the region.

In the educational field, the CCCHS can be integrated into the periodic evaluation of nursing students, allowing for the identification of areas for improvement in cultural training and guiding curricula toward less developed dimensions. In the clinical field, its application would contribute to identifying training needs among healthcare professionals working in culturally diverse contexts, enhancing the relevance of interventions and the quality of care.

Declaration of Interest

The authors declare no conflicts of interest related to this study.

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Data Availability

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

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