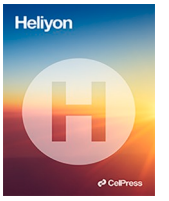
Heliyon 10 (2024) e23713

Contents lists available at ScienceDirect

Heliyon

journal homepage: www.cell.com/heliyon



Psychometric properties analysis of helping relationships skills inventory for Portuguese nurses and doctors

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ARTICLE INFO

Keywords:
Reliability and validity
Humanization of Assistance
Self-assessment
Nurses and doctors

ABSTRACT

Purpose: This paper answered some authors' requests to analyze the Helping Relationships Skills Inventory psychometric properties, a four dimensions measure. At this level, the study contributed to accessing the first reliable and valid instrument headed to Portuguese nurses and doctors. **Methods**: An online survey with Portuguese nurses and doctors (n = 262) was managed to assess the psychometrics properties analysis of the Helping Relationships Skills Inventory. Data were analyzed using descriptive statistics, confirmatory factor analysis, the average variance extracted (AVE), the heterotrait-monotrait ratio of correlations (HTMT), Cronbach's Alpha, and McDonald's Omega were computed. **Results:** The four-factor of the original Helping Relationships Skills Inventory was only supported by Exploratory Factor Analysis, with good internal consistency. Our study accepted this correlational structure hypothesis, which demonstrated acceptable to good sensitivity, convergent validity (AVE: 0.84–0.67), and reliability (Cronbach's Alpha: 0.92–0.88; McDonald'Omega: 0.93–0.79). Also stays verified discriminant validity for the majority of the factors with some reserves between Generics and Emphatics dimensions (HTMT: 0.90), revealing high commonality among them ($r = 0.84$; $p < .001$) **Conclusions:** The findings support the sensitivity, construct validity, and reliability of the Helping Relationships Skills Inventory among Portuguese nurses and doctors. However, will be useful to associate qualitative methodologies to explore the phenomenon better.

1. Introduction

The demand for humanized services often emerges in different settings of society, which means that this appeal is not exclusive to the healthcare field. However, inherent to the disease process, healthcare is undoubtedly the context where the person's vulnerability is most exposed, and scientific novelty quickly occurs in different levels of prevention [1,2]. Thus, the research interest in assessing humanized care has highly increased [3–5], as an urgent need to strengthen the accessibility to its services [2]. Studies have demonstrated a positive and inherent connection between clinical developments, care automatization, the disinvestment of work

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https://doi.org/10.1016/j.heliyon.2023.e23713
Received 21 April 2023; Received in revised form 8 October 2023; Accepted 12 December 2023
Available online 15 December 2023

conditions, the fragmentation of healthcare levels, and the depersonalization of care [6–8], mostly aggravated in the new pós-acute respiratory syndrome coronavirus era that caused an emotional strain among health professionals [9], which can result in burnout, lack of resources, and compassion fatigue [10–13]. It is possible to see health professionals acting in a technical-scientific and mechanized manner, often disregarding the human face [14], revealing how crucial it is to debate and invest in the issue of humanized care. On the other hand, individuals experiencing medical treatment as a set of symptoms rather than a human with singular needs [15], together with the application of economic value-based criteria, and the denial of suffering negatively affect the relationship between health professionals and patient [16,17] and can be considered as descriptors of dehumanized care [1].

The definition of humanized care remains vague [18], it coexists with the patient-centered [19], and person-focused [20] models, and its concept emerges as a need capable of minimizing the effects of a strong commitment to the technique practices [3]. The term "patient-centered", introduced by Balint in 1969, appears as an alternative to the disease-centered model [19,21,22], where the health professional, during a single episode, instead of being focused on the patient's symptoms, shows compassion, empathy, and respect for his individual needs, involving him in the decision-making process [23]. The person-focused model mainly adopts a holistic perspective and treats the disease in the life course setting [20]. Humanized care does not reject these principles. Instead, it embraces them and adds a new variable to the equation: the other stakeholders of the care process (i.e. health professionals, patient's caregivers, and policymakers) [1,24], considering all clinical processes and outcomes resulting from their relationships [3,25]. For example, a strong helping relationship with the person being cared for was commonly related to important health outcomes, such as quality, treatment effectiveness, patient disease management, healthy lifestyle, and satisfaction rating. However, it is crucial to provide reliable analyses of this association [26–28], even though, as assessed by patients and external observers, only a few professionals exhibit adequate helping competencies [27].

In Portugal, the last study in the area, using a multidimensional Inventory of Helping Relationships Competencies (ICRA) [29], a four-factor measure of generic, emphatics, communication, and contact competencies for nurses from different healthcare contexts, revealed that, overall, the lower value obtained was related to contact skills. However, it seems evident that community nurses showed more emphatic competencies than other sets. The positive correlation between helping relationships skills and continuous education programs on the theme is noteworthy. Specialized and management nurses tend to score higher on all the dimensions, mainly in communication skills [29]. Care, as the essence of the professionals' practice, requires that health teams, despite different contexts, know how to act with ethical commitment, sustaining relationships based on understanding, empathy, and respect. Therefore, it is perceptible that humanized care, to be rewarding, must be based on the reciprocity of professionals and the person cared for [30–32], requiring professionals with appropriate abilities, which should be developed during their academic formation training [33].

Although patient-centered and person-focused models have been acknowledged, the humanization of care is still understudied, and its assessment and implementation in healthcare settings, capturing the different voices of stakeholders, has received less attention, with only a few studies in some hospital clinical areas, focused on nurse care, mainly in pediatric and emergency services [3,8,24,28, 34–37]. [37] are strict in their concern regarding the included criteria of healthcare humanization and the empirical evidence obtained during the preceding five years. They highlighted that only 69 articles had been published, and merely two were clinical or comparison trials, with large unfounded research that underlines the urgent need to obtain scientific objectivity. The different studies, in terms of humanized care assessment, have also featured a diversity of methodological decisions, including external observations, professional and patients interviews, and professional instruments self-assessment, without drafting a robust standardized practice capable of allowing comparative results based on the use of the validated tools [2,8,15,25,31,38]. Taking into account the development and/or construction of humanized care models worldwide, evidence has shown a knowledge gap in this research field, a limitation that must become an opportunity, and a challenge for the construction and/or development of humanizing policies, linking health professionals and the person being cared for [32].

As the interest in humanized care has grown, it becomes important to analyze and contribute to validating tools, standardizing the approach capable of measuring the helping relationships between professionals and the person being cared for [39]. Although we have seen that the presented theme has become a high research call, among Portuguese nurses and doctors, regardless of the healthcare context, there is no complete, consistent, and valid instrument to measure their helping relationships competencies. Hence, this paper can be regarded as an answer to the request by Ref. [29]; to assess and reinforce the psychometric properties of ICRA by examining its last hypothesis of correlational structure. At this level, considering that ICRA has never been used or validated in other than the Portuguese context, the study aims to provide evidence for its validity and psychometric properties for Portuguese nurses and doctors, testing it through Confirmatory Factor Analysis (CFA), construct reliability, and validity. We believe that increasing its validity, the high-quality of the measurement tool, may promote ICRA cross-country expansion, and the replicability of future research into the processes and mechanisms by which therapeutic relationships impact and are linked to health outcomes, reinforcing its importance [29]. We hope to contribute to a more comprehensive understanding of this phenomenon, moving forward from scarce to more pieces of evidence [37].

2. The helping relationships skills inventory

The ICRA proposed by Ref. [40] is presented in the form of a Likert scale from 1 to 7 (ranging from strongly disagree to strongly agree) and provides a continuous score per dimension, in which the higher the value obtained, the higher level of helping relationships competencies is perceived. It was also the first Portuguese tool, composed of 51 items, capable of measuring the health relationships competencies in nursing students. In the ICRA development, the author established a conceptual structure based on Carkhuff (1969), Rogers (1985), Chalifour (1989), Egan & Lazure (1987) theories, and also on her clinical observations, opinions of experts, and interviews with health professionals defining the ICRA purpose and the target population (nursing students). Once the items and their

latent dimensions were defined, they were selected, organized, and structured into an inventory based on the Likert scale. Regardless of ICRA content validity, some standard recommendations were followed, namely: the creation of an expert committee; quantitative (rate of agreement), and qualitative procedures (Focus Group technique). Only after a pre-test, was the ICRA formally considered as constructed and one was able to assess its psychometric properties (internal consistency, and validity by the Exploratory Factor Analysis (EFA)).

According to the authors, based on the EFA results, the theoretical concept of health relationship competencies was organized as a multidimensional instrument operationalized by four first-order factors. Hence [40], identified them as generic (explained as 16.8 % of the total variance, defined as the way that the professional sees himself, the other, and his work), emphatics (12 % of the total variance, which is understood as the ability to be connected to the patient's world, accepted as unique), communications (9.62 % of the total variance, including important communication resources, like silence, listening, information synthesis and reformulation), and contact competencies (8.47 % of the total variance, which considers the professional's distance and his position regarding the patient). It should be noted that Cronbach's alpha value obtained per dimension was higher than 0.79, revealing a good internal consistency, increasing its confidence and accuracy. However, [29]; since the first participants' sample only included nurses undergoing training, which was different from the work context, considered it strategic to assess the ICRA psychometric properties (reliability and construct validity) in a new universe of nurses from other practice settings.

In a sample of 690 nurses (for 51 items), the researchers methodologically opted to use the EFA, obtaining a Cronbach's alpha higher than 0.83 and four factors explaining 44.3 % of the total variance. Once they used the principle of discontinuity [29], justified the exclusion of seven items, as they revealed loadings lower than 0.30. Therefore, they concluded that its empirical factor first-order structure, currently organized into 44 items, is identical to the first evidence and conceptual hypothesis [40], and also considered that the self-assessment instrument would make it possible to determine the importance attributed by health professionals to helping relationships skills in the work context, based on four dimensions, namely (1) generic competencies (items 1, 2, 3, 4, 5, 6, 7, 8, 9, 17, 18, 19, 20, 21, 22), (2) empathic competencies (items 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44), (3) communication competencies (items 23, 24, 25, 26, 27, 28, 29, 30, 31), and (4) contact competencies (items 10, 11, 12, 13, 14, 15, 16).

However, it is important to note that the authors [29,40] only supported the ICRA construct validation through EFA. Considering the opinion of [41]; although EFA provides the researcher with the quantity of information necessary to represent the data [42], recommend, as an essential procedure, the CFA. This is justified because that will confirm the instrument's structural model and how well the variables analyzed represent a smaller number of constructs. In this way, our study followed the alignment suggested by Ref. [29] at the end of their study for a call to future contributions that improve ICRA reliability and validity. We aim to analyze the four first-order factor structure, the construct validity, and the internal consistency of the ICRA dimensions [29] and to expand and validate new samples of nurses and doctors in the Portuguese Health System.

2.1. Sociodemographic questionnaire

Associated with the ICRA, several sociodemographic and professional characteristics were assessed to obtain data about participants, such as age (open field), gender (female, male, other), residence place, academic qualifications (first degree, master, doctoral degree), professional category, length of experience, including in the current workplace, work context (Primary Health Care, Hospital,

Table 1
Participants' sociodemographic characteristics.

Variable	N	%	M	SD	Range
Sex					
Female	73	27.9 %			
Male	189	72.1 %			
Age			39.4	10.5	21–64
Residence Place					
North	241	92 %			
Center	20	7.63 %			
South	1	0.38 %			
Academic Qualifications					
First degree	182	69.5 %			
Master's	78	29.8 %			
Doctoral	2	0.76 %			
Professional Category					
Nurse	111	42.4 %			
Specialized Nurse	66	25.2 %			
Doctor	22	8.40 %			
Specialized Doctor	63	24 %			
Length of experience			14.4	1.21	1–43
Length of experience (current workplace)			11.9	9.42	1–43
Work Context					
Primary Health Care	185	70.6 %			
Hospital	59	22.5 %			
Community	18	6.87 %			

and Community).

3. Method

3.1. Participants

Since we were seeking to test the last hypothesis of the ICRA correlational structure [29], through CFA, whose instrument consists of 44 items, the number of participants needed to adequately reproduce the population and follow the early recommendations [43] was based on the ratio of the participants to the item number, such as 5:1 or 10:1. Thus, only one group of participants was required, and included a total of 262 Health Care Providers by a convenient selection process. The majority of participants lived in the North of Portugal (92 %), followed by the Center (7.63 %) and the South (0.38 %). There were 189 males (72.1 %) and 73 females (27.3 %), ranging from 21 to 64 years old, with a mean age of 39.4 (SD = 10.5). Considering their academic qualifications, 69.5 % had a first degree, 29.8 % a master's, and 0.76 % a doctorate. The overall length of work experience ranged from one to 43 years, with a mean of 14.4 (SD = 1.21). The length of work experience in the current workplace context also ranged from one to 43 years, with a mean of 11.9 (SD = 9.42), of whom 42.4 % were nurses, without professional specialization; 8.40 % were doctors without professional specialization and 24 % with, working in Primary Health Care (70.6 %), Hospital (22.5 %), and community (6.87 %) contexts.

The sociodemographic data of the sample are shown in Table 1.

3.2. Procedures

The data collection took place from 1st May to August 31, 2022. Fifty-one health organizations, professional associations, and representative organisms were formally invited by the principal researcher to participate in an online survey on the Microsoft platform. Once the ethical approval was obtained, no institution declined to collaborate, demonstrating a solid interest in the study's purpose. Using the institutional and social contacts network, the sample participants were contacted by email. Hence, giving their free, informed, and voluntary consent, they automatically had online access to the questionnaire (Sociodemographic questionnaire and Self-assessment ICRA). It took three months to achieve the required sample size. During this period we carried out a weekly follow-up, counting, and downloading data, continuing the recruitment process based on the snowball method [44]. The online questionnaire included a brief research explanation and gave univocal instructions, ensuring that participants could leave the study at any time. Thus, the ICRA was self-administered, with the guarantee that the possible values assigned by the health professionals included in our sample were not based on prior knowledge of scores per dimension considered, given that none of the participants received any additional information about the results of previous studies carried out by the authors of the ICRA [29,40].

3.3. Data analysis

Firstly, we checked for normality considering skewness above three and kurtosis above 10, which should be rated as problematic and indicative of strong deviations from the normal distribution. There were no missing values since all items required mandatory answers in the helping relationships skills inventory. A few moderate univariate outliers were identified but were kept in the sample.

To assess the bias of the common method, capable of introducing a significant bias to research results, we conducted a Harman single-factor test for a Common Method Variance Analysis, estimating the exploratory factor analysis, by the principal axis factoring, and fixing all items on a single factor. Hence, we considered the bias presence when one single factor extracted the majority (higher than 50 %) of variance within the set of variables [45,46].

CFA was performed to assess if the covariance structure of the model [29] was similar to the covariance structure of the data [47]. The global quality of factorial adjustment was assessed by the main índices and values of reference recommended: chi-square ($\chi 2$), the $\chi 2$ and degree of freedom ratio ($\chi 2$/df), comparative fit index (CFI), Tucker-Lewis index (TLI), and the root means square error of approximation (RMSEA). The model fit was considered suitable for $\chi 2$/df values below five, CFI, and TLI of at least 0.90 (P. [48]; P. M. [49], and RMSEA below 0.10 [50]. The construct was also adjusted when theoretically grounded on the modification índices suggested. Therefore, we conducted a CFA using three models with different configurations: model 1 represented the instrument with a one-factor structure, gathering all 44 items in a single dimension; model 2 tested the last hypothesis of four factors structure obtained by Ref. [29]; without error correlations; model 3 assessed the ulterior model (2) with the suggested item's residuals covariances. We also assumed the ICRA's factorial validity, considering that all of the items' standardized factorial weights were higher than 0.50 ($\lambda ij \geq 0.50$, $\lambda ij^2 \geq 0.25$) [51].

Also, to assess the quality of ICRA's correlational model, we computed the Average Variance Extracted (AVE) [52–54]. Reference values above 0.50 suggest adequate convergent validity [52]. Discriminant validity was evaluated by computing the heterotrait-monotrait ratio of correlations (HTMT) [55]. This measure is a novel approach to determining discriminant validity that has revealed higher performance compared to the Fornell-Larcker criterion [52] and the assessment of (partial) cross-loadings [56]. If the HTMT is smaller than one, discriminant validity can be regarded as established. However, using the HTMT as a criterion requires comparing it to a predefined threshold, with some authors suggesting the proposed limit of 0.90 [57]. Thus, a higher HTMT value than this threshold allows us to conclude that there is a lack of discriminant validity. Moreover, Pearson correlations were performed between the ICRA dimensions, with values above 0.80 considered very strong, values between 0.60 and 0.80 considered strong, values between 0.40 and 0.60 considered moderate, values between 0.20 and 0.40 considered weak, and values below 0.20 considered negligible [58].

To assess internal consistency, Cronbach's alpha, and MacDonald's Omega were computed for each ICRA dimension, based on assessing values above 0.70 as acceptable and illustrating a good level of internal consistency [59]. Inter-item reliability was measured by computing the mean inter-item correlation for the ICRA dimensions and was supported in the recommended value that falls in the range of 0.15–0.50 [60], and the corrected item-total correlations in the considered cut point equal to or higher than 0.20 [51].

Data analysis was performed using IBM SPSS Statistics (v. 27, SPSS Inc, Chicago, IL) and JASP (v. 0.16.3.0). Results were considered statistically significant for $p < .05$. We followed all the standards listed in the recommended COSMIN tool for the risk of bias, which has determined our final rating as "very good" (Version 1.0, 2020) (L B Mokkink et al., 2020).

Ethical approval

We obtained participants' free, informed, and voluntary collaboration, and preserved confidentiality and anonymity, ensuring them they could leave the study at any time. In compliance with the General Data Protection Regulation law of May 2018, authorizations were obtained from the Ethics Committee for Research in Life and Health Sciences, University of Minho (document's identification: 001/2022).

Table 2
Descriptive and item analyses.

	M	SD	Me	Minimum	Maximum	Sk	Ku
Item 1	6.06	1.00	6	1	7	−1.45	3.88
Item 2	6.58	0.65	7	2	7	−2.22	9.17
Item 3	6.71	0.51	7	5	7	−1.53	1.42
Item 4	6.56	0.69	7	4	7	−1.47	1.56
Item 5	6.75	0.52	7	4	7	−2.35	6.44
Item 6	5.99	0.96	6	1	7	−1.37	3.25
Item 7	6.49	0.77	7	2	7	−1.91	5.24
Item 8	6.49	0.97	7	1	7	−2.34	6.34
Item 9	6.00	1.00	6	1	7	−0.98	1.72
Item 10	6.19	1.14	7	1	7	−1.85	4.10
Item 11	6.33	1.11	7	1	7	−1.98	4.04
Item 12	6.30	1.22	7	2	7	−1.90	2.87
Item 13	5.49	1.48	6	1	7	−0.99	0.52
Item 14	6.38	1.27	7	1	7	−2.49	6.10
Item 15	5.15	1.55	5	1	7	−0.85	0.38
Item 16	5.47	1.23	5	1	7	−1.08	2.27
Item 17	6.75	0.60	7	4	7	−2.58	6.41
Item 18	6.52	0.87	7	2	7	−2.03	4.22
Item 19	6.61	0.70	7	3	7	−1.89	3.64
Item 20	6.49	0.78	7	3	7	−1.50	1.81
Item 21	6.77	0.56	7	3	7	−2.99	11.4
Item 22	6.19	0.80	6	4	7	−0.59	−0.51
Item 23	6.45	0.86	7	1	7	−2.23	7.65
Item 24	6.40	0.91	7	2	7	−2.07	5.51
Item 25	6.14	0.95	6	1	7	−1.53	4.23
Item 26	5.77	0.80	6	3	7	−0.088	−0.37
Item 27	5.77	0.80	6	4	7	−0.020	−0.65
Item 28	6.16	0.85	6	3	7	−0.81	0.34
Item 29	6.39	0.67	6	4	7	−0.79	0.23
Item 30	6.37	0.69	6	4	7	−1.00	1.06
Item 31	6.38	0.81	7	1	7	−1.99	7.85
Item 32	5.07	1.34	5	1	7	−1.08	1.19
Item 33	6.46	0.94	7	1	7	−2.17	0.73
Item 34	5.32	1.04	5	2	7	−0.48	0.94
Item 35	6.37	0.92	7	1	7	−2.49	9.32
Item 36	6.34	1.01	7	1	7	−2.40	8.25
Item 37	6.48	0.94	7	1	7	−2.35	7.06
Item 38	6.50	0.85	7	3	7	−1.70	2.10
Item 39	6.48	0.87	7	3	7	−1.72	2.37
Item 40	6.14	1.40	7	1	7	−1.99	3.63
Item 41	6.34	1.04	7	1	7	−2.05	5.03
Item 42	5.49	1.34	5	1	7	−0.66	0.056
Item 43	5.89	0.79	6	2	7	−0.70	1.64
Item 44	6.64	0.71	7	3	7	−2.11	4.35

4. RESULTS

4.1. Preliminary analysis

In Table 2, we present the helping relationships skills inventory items' descriptive statistics. The seven-point Likert-type scale was entirely used in 47.7 % of the items, also the average scores for ICRA's items ranged between 5.07 (SD = 1.34) for item 32 and 6.75 (SD = 0.52) for item 5, not distancing itself from the range of items median, as a central value, ranging from 5 to 7. It should be noted that item 21 revealed some sensitive issues (Sk = −2.99, and Ku = 11.4; leptokurtic values), that may be explained by its content, as we can read "In the communication process I pay attention to non-verbal expressions, whose richness may be greater than verbal language". Considering the item's content, this ceiling effect is understandable. It is reasonable to expect that most people would emphasize the meaning and importance of non-verbal communication within the relationship process. Hence, we may explain in our sample the tendency for the majority of participants to reappoint the score in the Likert value of seven ("strongly agree") (M = 6.77; SD = 0.56; Me = 7).

Overall items presented adequate sensitivity, assuming absolute values of skewness and kurtosis within the accepted limits for a normal distribution (R. [61]; R. B [62]. Thus, we verified acceptable items' skewness (between 0.020 and 2.99), and kurtosis (ranging between 0.056 and 9.32).

4.2. Construct validity: confirmatory factor analysis, convergent and discriminant validity

CFA fit indices for the three proposed models are presented in Table 3. We first examined Model 1 representing the instrument with a one-factor structure, gathering all 44 items in a single dimension. Afterward, we tested the original four first-order latent factors of the ICRA (Model 2). Indicators of acceptable model fit were provided by chi-square statistic ($\chi 2$ (896) = 3887, P < .001), CFI = 0.99, TLI = 0.98, and RMSEA = 0.11, CI [0.11, 0.12]. However, modification indices (considered as threshold 11) suggested the correlation between errors of items 15 and 16, 26 and 27, and 29 and 30. The model modification indices found, and the theoretical content shared between those items resulted in the improved solution of Model 3 ($\chi 2$ (893) = 2580, p < .001, CFI = 0.99, TLI = 0.99 and RMSEA = 0.085, CI [0.081, 0.089]) (Fig. 1). Also, the standardized factorial weights and individual item reliability for the model are presented in Fig. 1.

The four combined fit índices for the CFA supported the four first-order latent structure (Model 3) for the original ICRA [29,40]. Also, in Model 3, the quality of the ICRA's local adjustment was supported by factorial validity ($\lambda ij \geq 0.50$, $\lambda ij^2 \geq 0.25$), considering that 42 items' standardized factorial weights were higher than 0.50 [51], except for items 26 ($\lambda ij^2 = 0.19$) and 34 ($\lambda ij^2 = 0.17$), with low saturation level, indicating the latent dimension explained less than 25 % of the result of those items.

Factor loadings (standardized regression weights) were used to calculate the AVE. Thus, regarding the AVE of each ICRA dimension, the overall data, based on a cut point equal to or higher than 0.50 [52], can be considered acceptable and confirmed the assumption of good convergent validity. To assess discriminant validity, we resorted to Henseler's online calculator (http://www.henseler.com/htmt.html). In addition, as we can see in Table 4, by comparing the HTMT values of each ICRA dimension to the predefined threshold of 0.90 [57], the discriminant validity for the majority of the factors is also verified with some reservations in the relation between Generics and Emphatics, as their value of 0.90 remained at the condition limit.

4.2.1. Common method variance

The Harman single-factor test of all the scale's items identified various factors, the largest of which accounted for 41.6 % of the total variance extracted, not showing evidence of common method bias [45,46]. Regarding the CFA of Model 1, where all items loaded in one single factor, it critically failed the overall fit test ($\chi 2/df = 5.99$, CFI = 0.978, TLI = 0.977; RMSEA = 0.14), giving us grounds to consider common method bias was not a significant problem of our model.

Additionally, we analyzed the correlations between the ICRA dimensions to check if there could be a high commonality between the factors. The correlations between the different dimensions ranged from very strong (r = 0.84, generics and emphatics) to strong (r = 0.77, generics and communication; r = 0.71, generics and contact; r = 0.70, emphatics and communication; r = 0.75, emphatics and contact; r = 0.63, communication and contact), implying higher commonality among them. Correlations were all positive and statistically significant (p < .001).

The generics competencies had a higher mean score (M = 97; SD = 7.62), and the contact competencies revealed a lower value (M = 41.3; SD = 7.01).

Table 3
CFA models fit indices (n = 262).

Model	Number of variables	$\chi 2$	Df	$\chi 2/df$	CFI	TLI	RMSEA
M (1)	89	5408	902	6.00	0.97	0.98	0.14
M (2)	92	3887	896	4.34	0.99	0.98	0.11
M (3)	92	2580	893	2.89	0.99	0.99	0.085

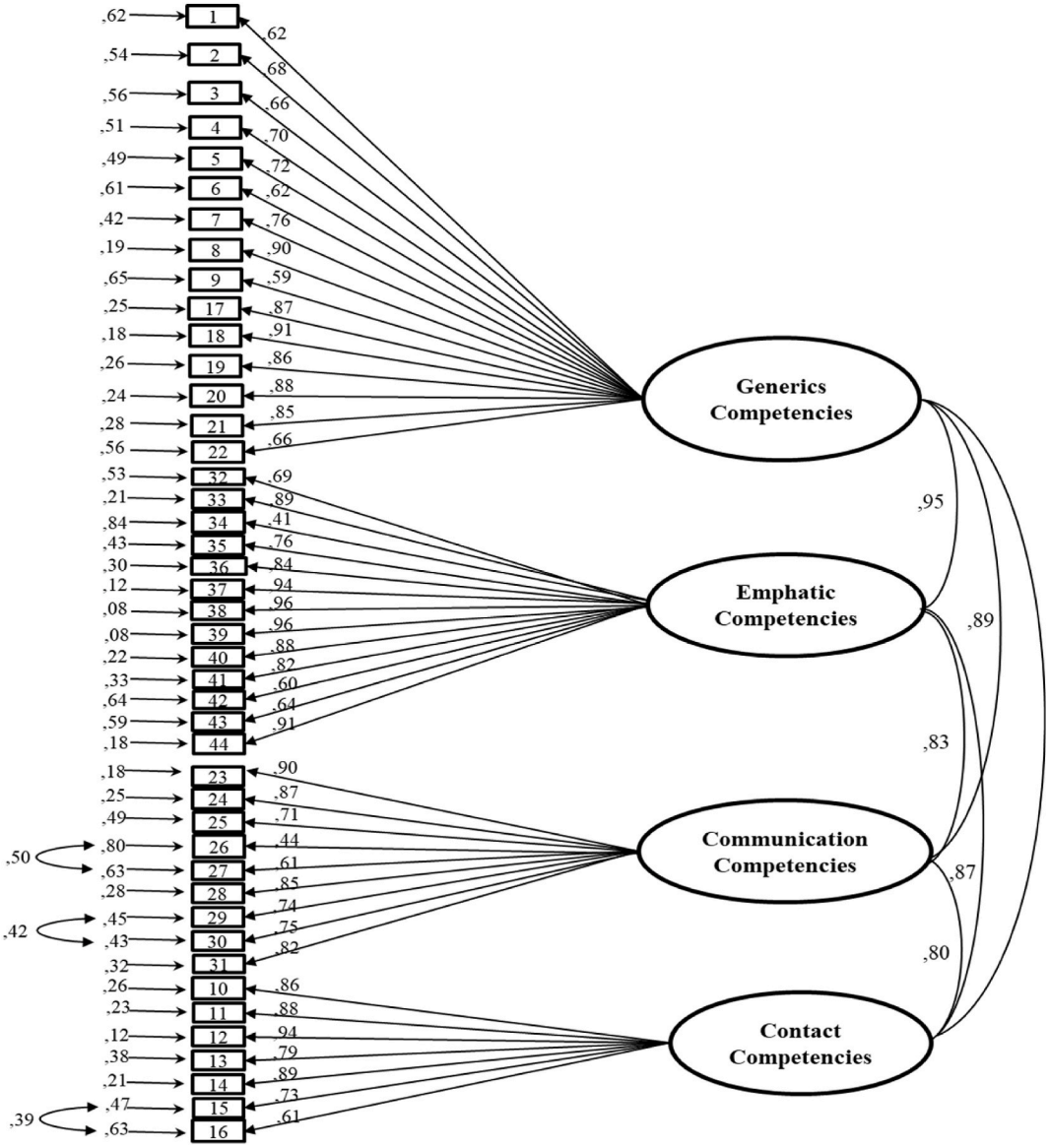

Fig. 1. Model 3: Factor loadings and covariances for the four first-order latent factors structure.

Table 4
Discriminant Validity using HTMT.

Factor	Generic	Emphatic	Communication	Contact
Generic	–			
Emphatic	0.90	–		
Communication	0.86	0.78	–	
Contact	0.78	0.83	0.70	–

4.3. Reliability of the scores: internal consistency evidence

Cronbach's Alfa (α) was 0.96, suggesting very good internal consistency evidence. Additionally, we present other reliability estimates, such as inter-item reliability, and MacDonald's Omega (ω), allowing future comparisons with other studies.

Table 5 displays the internal consistency, mean inter-item correlations, and corrected item-total correlation range for the ICRA dimensions. overall, confirming that the ICRA dimensions have exhibited good internal consistency. Nonetheless, all the mean inter-item correlations fell in the acceptable value range of 0.15–0.50 [60], and the corrected item-total correlation also demonstrated good

Table 5
ICRA dimensions of internal consistency.

Dimensions	Cronbach's Alfa	MacDonald's Omega	Mean inter-item correlations	Corrected item-total correlation range
Generic	0.91	0.93	0.41	0.36–0.70
Emphatic	0.92	0.91	0.50	0.38–0.85
Communication	0.88	0.81	0.44	0.52–0.70
Contact	0.89	0.79	0.54	0.61–0.75

values, above 0.20 [51].

5. Discussion

This study aimed to examine the previous hypothesis of ICRA correlational structure [29], contributing to the access to the first reliable and validated construct instrument capable of measuring the helping relationships competencies of Portuguese nurses and doctors. As previously mentioned, the ICRA version used in the current research corresponds to a modified 44-item form, supported by exploratory factor analysis [29], which showed good psychometric indices, and has been presented as an update of the original 51-item scale proposed by Ref. [40]; for Portuguese nursing students. In our study, we opted to include Portuguese nurses and doctors since they work daily in a continuous and interprofessional collaboration to provide the best healthcare practices, techniques, and humanized relationships, independently of their professional functions. Thus, they are seen as a unique team, closest to the person being cared for. Therefore, by undertaking the process of a construct validation based on CFA and its reliability and internal consistency assessment, we brought new contributions to this research field.

Our results suggested that overall for ICRA no item psychometric sensitivity problems were found, except for item 21, revealing some issues in distribution (leptokurtic value), which we believed could be related to the item's semantics. However, considering the significance of the item within the theoretical construct and its standardized factorial weight in the model, which underpins the assessment of the importance of non-verbal communication in the helping relationships between health professionals and the person being cared for, we decided to maintain it in the final structure.

The final CFA of the ICRA confirmed the last structure correlational hypothesis model [29] after three confirmatory factorial models were tested: a one-factor structure (Model 1), four first-order factors, representing the theoretical structure (Model 2), and the four first-order factors representing the theoretical structure with error items correlated (Model 3) (P. [48]; P. M [49]. In Model 3, the quality of ICRA's local adjustment is demonstrated by factorial validity ($\lambda ij \geq 0.50$, $\lambda ij^2 \geq 0.25$), considering that 42 items' standardized factorial weights were higher than 0.50 [51], except for item 26 ($\lambda ij^2 = 0.19$) and 34 ($\lambda ij^2 = 0.17$). Common method variance was also tested. Since we can not completely remove the possibility of bias we computed the Harman single-factor test of all the ICRA items, as presented in the CFA Model 1 [45,46], which critically fail the overall fit test, allowing us to affirm that the common method bias was not a significant problem of our model. It is limited and unlikely to confound the interpretation of our results.

Furthermore, the ICRA dimensions also manifested acceptable values of AVE and confirmed the good convergent validity assumption based on a cut point equal to or higher than 0.50, demonstrating that items contained within each factor are related to each other [52–54]. Additionally, by comparing the values of HTMT ICRA's dimension to the predefined threshold of 0.90 [57], we also verified the discriminant validity for the generality of the factors, which means that they were sensitive to the different aspects of the same construct. Still, we could not assume it in the relationship between the Generics and Emphatics dimensions, as their value of 0.90 expressed some reservations by the condition limit, especially if we analyze its very strong correlations value ($r = 0.84$; $p < .001$). Hence, we must equally highlight the assumption of high commonality among them.

Notwithstanding these results in our sample, compared to Ref. [29] data, which obtained moderate values of correlation between these dimensions ($r = 0.59$; $p < .001$) justifying the presence of different constructs, we opted to maintain this correlational structure of four first-order factors with no overlapping. For this, we relied on the comprehensive and relational items content with every single factor, within the theoretical construct, ensured by its factorial weight and convergent validity in the model. The same structure hypothesis (Model 3) in our analysis revealed a good fit for global and local adjustment.

In terms of the construct's reliability, the ICRA dimensions presented acceptable and good values of internal consistency above 0.70 [59,63] for ordinal Cronbach's Alfa, contributing to a sense of global quality [64]. Our data, compared to Refs. [29,40]; for Cronbach's Alpha for all dimensions ($\alpha > 0.83$; $\alpha > 0.75$, respectively), showed a better value ($\alpha = 0.96$). Moreover, we present other reliability estimates, even those not yet estimated in previous ICRA studies [29,40], such as inter-item reliability or MacDonald's Omega, which we believe allow future comparisons with other preceding studies. MacDonald's Omega for the total sample revealed good internal consistency (0.97), including the mean item-inter correlations values of ICRA dimensions, which fell in the range of 0.15–0.50 [60]. The corrected item-total correlation range also demonstrated good results, above 0.20 [51]. We also confirmed that the reliability construct did not detract if items 26 and 34, both with lower factorial weights than 0.50, were dropped from the model. Based on this assumption and the theoretical relevance of the latent construct, we sustained our decision to keep them. Moreover, to enable future cross-country research, we recommend preserving the original ICRA structure.

Furthermore, all the correlated dimensions observed seem to operationalize the theoretical concept of helping relationships competencies among Portuguese nurses and doctors, despite different healthcare contexts, which to be perceptible should be sustained by good communication skills, contact reciprocity, empathy, and respect performance [30–32]. Nonetheless, we did not apply bivariate techniques to compare means or correlate some socio-professional variables with the ICRA dimensions scores obtained so as

not to move away from the research directions outlined.

However, in our sample, the generics competencies, understood as the ability to be connected to the patient's world, and accept him as unique, was the dimension with the highest mean score obtained, and the contact competencies the lowest one, which considers the professional's distance and his position regarding the patient. These findings are in line with previous studies involving nursing students, such as those by Refs. [29,38]; which consistently demonstrated the positive outcomes of implementing Intervention Programs centered on group dynamics and individual tasks. These programs are firmly rooted in a Rogerian cognitive-behavioral and humanistic approach to human development, as detailed by Ref. [38]. Empirical evidence, resulting from these interventions, underscored significant improvements in self-concept, assertiveness, alexithymia, helping relationship skills, and interpersonal communication [38]. Bearing this in mind, the importance of students and health professionals self-assessing their relational helping skills using reliable and validated instruments, of which the ICRA is an example, is highlighted as one of the important applications and contributions of this study. At this level, we believe that Portuguese health professionals and health students, including other social actors such as professors and health managers, by using the ICRA can more easily identify their vulnerabilities and strengths, threats, and opportunities in external contexts (labor, academic). It is hoped that by making themselves available to continually invest in developing and improving their interpersonal skills, but also their intrapersonal skills (self-knowledge, self-regulation), they will be able to achieve the highest level of humanization and effectiveness in their helping relationship with the cared-for person (Chalifour, 2009).

This opinion is reinforced by Del Prette & Del Prette (2018), who consider that the promotion of social skills development programs has been used to improve the interpersonal qualities needed to perform an efficient job in different areas of activity, such as nursing, medicine, psychology, and even the exact sciences, whose impact is visible not only in academic performance but also in the acquisition of soft skills, facilitating entry into the job market.

The helping relationship, as an essential dimension inherent in the provision of health care, converges towards an intervention that goes far beyond the technical component promoted in the curricula of nursing and medical students, including the standardized guidelines on procedures that only value the technical performance of professionals in terms of managing a person's health and illness, in a hospital or PHC context. In this sense, we envisage that the ICRA could be used as a tool for diagnosis, self, and hetero-knowledge of the individuality of health professionals and students. Recognizing its importance in the academic and organizational health context allows the different social actors to promote an intentional, planned, and joint approach to empowering individual health students and healthcare providers in terms of humanization and helping relationship skills.

To the best of our knowledge, this is the first study to develop an ICRA construct validation for Portuguese nurses and doctors, in full alignment with recent research calls, contributing to the tools' validation and the standardization of the approach of measuring the helping relationships between professionals and the person being cared for [39]. Hence, given the factorial and internal consistency results, we recommend the application of the ICRA, adapted to any healthcare setting, considering its research field interest.

The plausibility of ICRA's assessed psychometrics properties could be an opportunity to overcome some researchers' concerns regarding the objectivity of empirical evidence obtained by the dearth use of validated tools in the humanized care field [2,8,15,25,31,38]. The amount of unfounded research worldwide underlines the urgency of that call [37].

From a methodological point of view, this study has some limitations such as the non-comparison of the measures obtained from more similar research using ICRA instruments, because among Portuguese nurses and doctors, regardless of the healthcare context, there is no completed consistent, and validated instrument to measure their helping relationships competencies. Moreover, we used an (N = 262) convenience sample of (N = 177) nurses and (N = 85) doctors, which was not representative of the Portuguese population, introducing some issues on a possible generalization of ICRA scores for dimensions obtained in our sample. We are aware that web surveys present low response rates [65]. But we must consider that the ICRA length, in terms of item numbers (44), resulted in a limitation to obtaining sufficient participants for the maximum ratio of 10:1 items [43]. Furthermore, based on the considerations for measurement invariance testing in analysis planning [66], it constituted an obstacle that did not allow us to complement our research with multigroup analyses for testing the ICRA invariance between some sociodemographic variables (sex, and professional category).

For future studies, during the study design and before considering any ICRA measurement invariance analyses between different variable groups, it will be important that the researcher also consider the groups' sample size. However, given the lack of further research, it reinforces that this simple size consideration should be a starting point, not a solo condition capable of impacting the sample size requirements. We also must know that if the amount of items and groups increases, statistical power decreases, thus increasing the required sample size [66].

We also know that the present study and the previous two [29,40] have followed the cross-sectional design. Therefore, to increase the ICRA feature's validity and reliability, in terms of internal consistency stability and ICRA's score temporal invariance, we suggest that researchers should also plan longitudinal designs. Finally, regarding the inexistence of Portuguese instruments capable of measuring helping relationships among nurses and doctors, we did not administer other scales that would help us to further establish the convergent validity of the ICRA.

We are confronted with the need to better know where we stand today and where we are heading with our healthcare practice [67]. Meanwhile, for a better understanding of the humanized care phenomenon, we anticipate that it would be relevant to associate qualitative methodologies, capable of fully capturing and describing the patients' and professionals' perceptions. Indeed, these additional studies will be important for capturing the different voices of stakeholders, contributing to the growth of the empirical evidence concerning humanized care in different practice contexts, which have received fewer studies [3,8,24,28,34–37]. Therefore, we must strengthen the proactivity in analyzing this important concept related to the health system value chain, in several other practice settings.

6. Conclusion

This paper presents the first instrument validation for Portuguese nurses and doctors, capable of measuring their helping relationships competencies. Our findings support the validity and reliability of the ICRA, as a correlational model of first-order latent, factor which has resulted in a good fit measure. Thus, based on our data we recommend the use of the ICRA.

The recent political, and growing scientific interest in analyzing and exploring the concept of healthcare humanization linking to the person and system's outcomes, as a way to raise trust, quality, care safety, and holistic intervention, without neglecting each stakeholder's need, has globally spread the call for an increase in the empirical contribution in this area. In this sense, we believe that our study may strengthen the accessibility to a validated tool, standardizing the researchers' approach, considered as a limitation to data comparison. We believe that such results could reinforce and justify the higher importance of having humanized professionals and organizations alongside technical skills. Thus, one of the future applications of this study could be the possibility of students and health professionals self-assessing their relational helping skills using reliable and validated instruments, of which the ICRA is an example. In this way, we expect the ICRA to be a screening, self, and hetero-knowledge tool for health professionals and students to understand their individuality. This allows for the promotion or utilization of a range of educational and training initiatives that support the development and reinforcement of relational helping skills. The many social actors (professors and health managers) will be equipped to support a deliberate, planned, and collaborative approach to empowering health students and health professionals in terms of humanization and helping relationship skills, recognizing their significance in the academic and organizational context of health. Therefore, for future research, it will be useful to consider qualitative methodologies, regarding the contributions of stakeholders (patients, health professionals, academics, and health managers) to further explore this dimension of analysis: the use of ICRA in clinical practice.

Meanwhile, more studies will be helpful to adapt and validate the ICRA regarding other additional reliability measures, such as internal consistency stability and the ICRA's score temporal invariance. Likewise, we suggest that other sample groups of health professionals should be included (e.g., nutritionists, therapeutic and diagnosis technicians, and pharmacists), deemed fundamental stakeholders of the health system.

Funding

This research did not receive any external funding.

Data availability

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Study registration

This research is not registered or notified.

CRediT authorship contribution statement

Adriana Taveira: Formal analysis, Investigation, Writing – original draft, Writing – review & editing, Investigation, Writing – original draft, Writing – review & editing. **Ana Paula Macedo:** Supervision, Validation. **Silvana Martins:** Formal analysis. **e Patrício Costa:** Conceptualization, Methodology, Supervision, Validation.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

[1] C. De Fuente-Martos, Humanization in healthcare arises from the need for a holistic approach to illness ☆, Med. Intensiva 42 (2) (2018).
[2] R. Guerrero-Ramírez, M.M.E. Riva, M. D. La Cruz-Ruiz, Cuidado humanizado de enfermería según la teoría de Jean Watson, servicio de medicina del Hospital Daniel Alcides Carrión. Lima- Humanized care of nursing according to the theory of Jean Watson, medical service of the hospital Daniel Alcides Carrión, Revista Enfermagem Herediana 9 (2) (2015) 133–142.
[3] I.M. Busch, F. Moretti, G. Travaini, A.W. Wu, M. Rimondini, Humanization of care: Key elements identified by patients, caregivers, and healthcare providers. A systematic review, The Patient - Patient-Centered Outcomes Research 12 (5) (2019) 461–474, https://doi.org/10.1007/s40271-019-00370-1.
[4] O. Husson, P. Huijgens, W. Van der Graaf, Psychosocial challenges and health-related quality of life of adolescents and young adults with hematologic malignancies, American Society of Hematology (2018) 1–17, https://doi.org/10.1182/blood-2017-11-778555.
[5] E. Setoodegan, S. Gholamzadeh, M. Rakhshan, H. Peiravi, International journal of nursing sciences nurses' lived experiences of professional autonomy in Iran, Int. J. Nurs. Sci. 6 (3) (2019) 315–321, https://doi.org/10.1016/j.ijnss.2019.05.002.
[6] A.K. Agarwal, B.B. Murinson, D. Ph, New dimensions in patient–physician interaction: values, autonomy, and medical information in the patient-centered clinical encounter, Rambam Maimonides Medical Journal 3 (3) (2012) 1–11, https://doi.org/10.5041/RMMJ.10085.
[7] O. Alberto, B. Salazar, Humanized care: a relationship of familiarity and affectivity, Invest Educ Enferm 31 (3) (2015) 17–27.

[8] E. Lovato, D. Minniti, M. Giacometti, R. Sacco, A. Piolatto, B. Barberis, R. Papalia, F. Bert, R. Siliquini, Humanisation in the emergency department of an Italian hospital: new features and patient satisfaction, Emerg. Med. J. (2013), https://doi.org/10.1136/emermed-2012-201341. October 2010, 2010–2014.

[9] T.L. Rangel, T. Saul, R. Bindler, J.K. Roney, R.A. Penders, R. Faulkner, L. Miller, M. Sperry, L. James, M.L. Wilson, Exercise, diet, and sleep habits of nurses working full-time during the COVID-19 pandemic: an observational study, Appl. Nurs. Res. 69 (December 2022) (2023), 151665, https://doi.org/10.1016/j.apnr.2022.151665.

[10] E. Elder, A.N.B. Johnston, M. Wallis, J. Crilly, The demoralisation of nurses and medical doctors working in the emergency department: a qualitative descriptive study, International Emergency Nursing (2020), 100841, https://doi.org/10.1016/j.ienj.2020.100841. August 2019.

[11] E. Hollnagel, R.S. Plus, R. Wears, J. Braithwaite, From Safety-I to Safety-II: A White Paper from Safety-I to Safety-II: A White Paper Professor Erik Hollnagel University of Southern Denmark, Institute for Regional University of Florida Health Science Center Jacksonville, United States of America Prof, 2015, https://doi.org/10.13140/RG.2.1.4051.5282 (Issue January).

[12] A.H. Rosenstein, Addressing physician stress, burnout, and compassion fatigue : the time has come, Isr. J. Health Pol. Res. 2 (1) (2013) 1, https://doi.org/10.1186/2045-4015-2-32.

[13] L.A. Wolf, A.M. Delao, C. Perhats, P.R. Clark, C. Edwards, W.D. Frankenberger, Traumatic stress in emergency nurses: does your work environment feel like a war zone? International Emergency Nursing 52 (June) (2020), 100895 https://doi.org/10.1016/j.ienj.2020.100895.

[14] J.S. Luchsinger, J. Jones, A.K. Mcfarland, K. Katherine, Examining nurse/patient relationships in care coordination: a qualitative meta synthesis, Appl. Nurs. Res. 49 (March) (2019) 41–49, https://doi.org/10.1016/j.apnr.2019.07.006.

[15] R. Behruzi, M. Hatem, L. Goulet, W.D. Fraser, Health care for women international perception of humanization of birth in a highly specialized hospital: let's think differently, Health Care ForWomen International (2013) 37–41, https://doi.org/10.1080/07399332.2013.857321. January 2015.

[16] R. Kaba, P. Sooriakumaran, The evolution of the doctor-patient relationship, Int. J. Surg. 5 (2007) 57–65, https://doi.org/10.1016/j.ijsu.2006.01.005.

[17] K.C. Stange, The problem of fragmentation and the the problem of fragmentation, Ann. Fam. Med. (2009) 100–103, https://doi.org/10.1370/afm.971.AN.

[18] G. Mortamet, N. Roumeliotis, F. Vinit, C. Simonds, L. Dupic, P. Hubert, Is there a role for clowns in pediatric intensive care units? BMJ 1–4 (2017) https://doi.org/10.1136/archdischild-2016-311583.

[19] E. Balint, The possibilities of patient-centered medicine, in: COLL. GEN. PRACTrf., 1969, pp. 269–276.

[20] B. Starfield, P. Care, Is Patient-Centered Care the Same As Person-Focused Care? 15 (2) (2011) 63–69.

[21] P. Care, C. Ells, M.R. Hunt, J. Chambers-Evans, Relational autonomy is an essential component of patient-centered care, The International Journal of Feminist Approach to Bioethics 4 (2) (2011).

[22] B.C. Drolet, C.L. White, Virtual Mentor 14 (7) (2012) 582–588.

[23] M.J. Barry, S. Edgman-Levitan, V. Billingham, Shared Decision Making — the Pinnacle of Patient-Centered Care, 2012, pp. 780–781.

[24] A. Cassiano, M. Araujo, C. Holanda, R. Costa, Percepção de enfermeiros sobre a humanização na assistência de enfermagem no puerpério imediato Perception, Revista de Pesquisa Cuidado é Fundamental 7 (1) (2015) 2051–2060, https://doi.org/10.9789/2175-5361.2015.v7i1.2051-2060.

[25] D.S. Backes, M.S. Koerich, H. Does, H.E. Practice, Humanizing care through the valuation of the human being, Rev Latino-Am Enfermagem 15 (1) (2007) 34–41.

[26] D. Eton, J.L. Ridgeway, M. Linzer, D.H. Boehm, E.A. Rogers, K.J. Yost, L.J.F. Rutten, J.L.S. Sauver, S. Poplau, R.T. Anderson, Healthcare Provider Relational Quality Is Associated with Better Self-Management and Less Treatment Burden in People with Multiple Chronic Conditions, 2017, pp. 1635–1646.

[27] E. Magen, H.M. Delisser, Best practices in relational skills training for medical trainees and providers: an essential element of addressing adverse childhood experiences and promoting resilience, Academic Pediatrics 17 (7) (2017) S102–S107, https://doi.org/10.1016/j.acap.2017.03.006.

[28] A. Prip, K.A. Moller, D.L. Nielsen, M. Jarden, Marie-Helene Olsen, A.K. Danielsen, The patient Y healthcare professional relationship and communication in the oncology outpatient setting, Cancer Nurs. 41 (5) (2018) 11–22, https://doi.org/10.1097/NCC.0000000000000533.

[29] R. C. C. P. de Melo, M.J.P. Silva, P.M.D. Parreira, M.M.C. Ferreira, Competências relacionais de Ajuda nos, Revista Esc Enferm USO 45 (6) (2011) 1387–1395.

[30] W. Emmamally, C. Erlingsson, P. Brysiewicz, C. Sciences, W. Emmamally, Describing healthcare providers' perceptions of relational practice with families in the emergency department : A qualitative study (2018) 1–7.

[31] A. Franzon, P.M. Lohmann, A.E.K. Costa, E. Lavall, A humanização da assistência em enfermagem no cuidado ao paciente: percepção dos enfermeiros de dois hospitais do interior do estado do Rio Grande do Sul the humanization of nursing care in patient care : perception of nurses from two hospitals in the in, Research, Society and Development (2022) 1–13, 2022.

[32] M.E. Meneses-la-Riva, J.A. Suyo-Vega, Humanized Care From the Nurse – Patient Perspective in a Hospital Setting: A Systematic Review of Experiences Disclosed in Spanish and Portuguese Scientific Articles 9 (December) (2021) 1–10, https://doi.org/10.3389/fpubh.2021.737506.

[33] R. Christopher, C. Chts-cp, L. De Tantillo, J. Watson, L.L. Aan, Academic caring pedagogy, presence, and Communitas in nursing education during the COVID-19 pandemic, Nurs. Outlook 0 (2020) 1–8, https://doi.org/10.1016/j.outlook.2020.08.006.

[34] R. Cândida, D.C. Pereira, Desenvolvimento de competências relacionais de ajuda: estudo com estudantes de enfermagem, Revista Portuguesa de Pedagogia 41–1 (2007) 189–209.

[35] L. Chavane, M. Da, L. Vaz, S. Arscott-mills, B. Rawlins, Quality and Humanization of Care Assessment (QHCA) A Study of the Quality of Maternal and Newborn Care Delivered in Mozambique's Model Maternities (Issue March), 2013.

[36] I.M. Galvin, J. Leitch, R. Gill, B.K. Poser, S. Mckeown, Humanization of critical care — psychological effects on healthcare professionals and relatives : a systematic review Humanisation des soins critiques — effets psychologiques sur les membres de la famille : une revue professionnels de la sante ′ matique syste, Canadian Journal of Anesthesia/Journal Canadien d'anesthésie (2018), https://doi.org/10.1007/s12630-018-1227-7.

[37] A. García-Salido, G. Heras la Calle, A. Serrano González, Narrative review of pediatric critical care humanization: where we are? Med. Intensiva 43 (5) (2019) 290–298.

[38] C. Lopes, R. Cristina, D.A.S. Azeredo, C. Rodrigues, R. Cristina, C. Lopes, Z. De Aguiar, S. Azeredo, R. Manuel, C. Rodrigues, Competências relacionais dos estudantes de enfermagem: follow-up de programa de intervenção, Referência - Revista de Enfermagem 9 (2013) 27–36.

[39] E. Mccabe, M. Miciak, L.D. Msclis, L.P. Manns, C. Guptill, J. Hall, M. Student, D.P. Gross, Measuring Therapeutic Relationship in the Care of Patients with Haemophilia: A Scoping Review, 2018, https://doi.org/10.1111/hex.12827. April, 1208–1230.

[40] M. Ferreira, Relação de ajuda na formação dos enfermeiros, 2004.

[41] A. C. de Souza, N.M.C. Alexandre, E. de B. Guirardello, Propriedades psicométricas na avaliação de instrumentos: avaliação da confiabilidade e da validade, Epidemiol. Serv. Saude 26 (3) (2017) 649–659, https://doi.org/10.5123/S1679-49742017000300022.

[42] L.B. Mokkink, C.B. Terwee, D.L. Patrick, J. Alonso, Terminology and definitions of measurement properties for health-related the COSMIN study reached international consensus on taxonomy, terminology, and definitions of measurement properties for health-related patient-reported outcomes, J. Clin. Epidemiol. 63 (7) (2010) 737–745, https://doi.org/10.1016/j.jclinepi.2010.02.006.

[43] M.W. Watkins, Exploratory factor analysis: a guide to best practice, J. Black Psychol. 44 (3) (2018) 219–246, https://doi.org/10.1177/0095798418771807.

[44] C. Parker, Snowball Sampling, SAGE Publications, 2020, https://doi.org/10.4135/Official.

[45] P.M. Podsakoff, S.B. Mackenzie, J. Lee, N.P. Podsakoff, Common method biases in behavioral research: a critical review of the literature and recommended remedies, J. Appl. Psychol. 88 (5) (2003) 879–903, https://doi.org/10.1037/0021-9010.88.5.879.

[46] P.M. Podsakoff, S.B. Mackenzie, N.P. Podsakoff, Sources of method bias in social science research and recommendations on how to control it, Annu. Rev. Psychol. 63 (1) (2012) 539–569, https://doi.org/10.1146/annurev-psych-120710-100452.

[47] G.W. Cheung, R.B. Rensvold, Structural equation modeling : a evaluating goodness-of-fit indexes for testing measurement invariance, Struct. Equ. Model.: A Multidiscip. J. 9 (2) (2002) 233–255.

[48] P. Bentler, P. Dudgeon, Covariance structure analysis: statistical practice, theory, and directions, Annu. Rev. Psychol. 47 (1) (1996) 563–592.

[49] P.M. Bentler, Comparative fit indexes in structural models, Psychol Bul 107 (2) (1990) 238–246.

[50] T. Brown, Confirmatory Factor Analysis for Applied Research, Guilford, 2015 (; second edi)).

[51] B. Tabachnick, L. Fidell, in: P. Education (Ed.), Using Multivariate Statistics, seventh ed., 2019.

[52] C. Fornell, D.F. Larcker, Evaluating structural equation models with unobservable variables and measurement error, American Marketing Association 18 (1) (1981) 39–50.
[53] J.F. Hair, B. Black, B. Babin, R.E. Anderson, Multivariate Data Analysis, 6a edition, Prentice Hall, 2010.
[54] F. Valentini, Variância Média Extraída e Confiabilidade Composta: indicadores de Precisão 1 2 Artigos Originais Average Variance Extracted and Composite Reliability: reliability Coefficients, Psicol. Teor. Pesqui. 32 (2016) 1–7.
[55] J. Henseler, C.M. Ringle, M. Sarstedt, A new criterion for assessing discriminant validity in variance-based structural equation modeling, J. Acad. Market. Sci. (2015) 115–135, https://doi.org/10.1007/s11747-014-0403-8.
[56] G. Franke, M. Sarstedt, G. Franke, Heuristics versus Statistics in Discriminant Validity Testing : a Comparison of Four Procedures, 2019, https://doi.org/10.1108/IntR-12-2017-0515. Internet Research.
[57] A.H. Gold, A. Malhotra, A. Segars, Knowledge management: an organizational capabilities perspective knowledge management: an organizational capabilities perspective andrew H gold ; arvind malhotra ; albert H segars, J. Manag. Inf. Syst. 18 (2001) 185–214.
[58] P. Schober, C. Boer, L.A. Schwarte, Correlation coefficients: appropriate use and interpretation, Anest Analg 126 (5) (2018) 1763–1768, https://doi.org/10.1213/ANE.0000000000002864.
[59] J.L. Ventura-León, T. Caycho-Rodríguez, Cartas al Editor El coeficiente Omega: un método alternativo para la estimación de la confiabilidad, Revista LatinoameRicana de Ciencias SociaLes, Niñez y Juventud El 15 (1) (2017) 625–627.
[60] S.R. Briggs, J.M. Cheek, The role of factor analysis in the development and evaluation of personality scales, Journal of Personality, March (1986) 107–148.
[61] R. Kline, in: G. Press (Ed.), Principles and Practice of Structural Equation Modeling, fourth ed., 2016.
[62] R.B. Kline, in: A.P. Association (Ed.), Principles and Practice of Structural Equation Modeling, 1998.
[63] J. Nunnally, Psychometric Theory, second ed., McGraw-Hill, 1978.
[64] D. Borsboom, G.J. Mellenbergh, The concept of validity, Psychol. Rev. 111 (4) (2004) 1061–1071, https://doi.org/10.1037/0033-295X.111.4.1061.
[65] D.S. Massey, R. Tourangeau, The ANNALS of the American academy of political and social science, Ann. Am. Acad. Polit. Soc. Sci. (2013), https://doi.org/10.1177/0002716212463314.
[66] R. Luong, J.K. Flake, Measurement invariance testing using confirmatory factor analysis and alignment optimization: a tutorial for transparent analysis planning and reporting raymond, Psychol. Methods 28 (4) (2023 Aug) 905–924, https://doi.org/10.1037/met0000441. Epub 2022 May 19. PMID: 35588078.
[67] A.G. Salido, A.S. González, Knock, knock, knockin'… on critical care's door, Intensive Care Med. 4619 (2016), https://doi.org/10.1007/s00134-016-4619-6.