

Construct validity and reliability of the scale Families' Importance In Nursing Care-Nurses' Attitudes

Validade de construto e confiabilidade do *Families' Importance In Nursing Care-Nurses' Attitudes*
 Validez del constructo y fiabilidad del *Families' Importance In Nursing Care-Nurses' Attitudes*

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Abstract

Objective: To assess the construct validity and internal reliability of the Brazilian version of the scale Families' Importance in Nursing Care-Nurses' Attitudes (FINC-NA).

Methods: This is a methodological study, whose data were collected in November 2019, with 283 nurses, working in three university hospitals in the state of Paraná. Cronbach's α coefficient was used to determine internal consistency, exploratory factor analysis (EFA) in principal components, with Varimax rotation for construct validity. The relationship between observed variables and latent variables was assessed using confirmatory factor analysis (CFA).

Results: Participants had an average age of 40 years, most were married, female, and more than 30% had a master's or doctoral degree. In EFA, five items were eliminated (correlation below 0.30). The final model retained three factors, explaining 52.2% of the data variance, which were theoretically reinterpreted. In CFA, the three factors showed a strong correlation (above 0.7); however, three more items were excluded. A cause-and-effect relationship was not confirmed between the three constructs, but it was confirmed that the items are reliable for measuring the three new dimensions after reinterpretation, as all factor loadings are greater than 0.5. The final validated instrument has 18 items distributed into three factors and a Cronbach's α coefficient of 0.91.

Conclusion: The scale has satisfactory psychometric properties, demonstrating adequate evidence of validity and reliability.

Resumo

Objetivo: Avaliar a validade de construto e a confiabilidade interna da versão brasileira da escala *Families' Importance in Nursing Care-Nurses' Attitudes* (FINC-NA).

Métodos: Estudo metodológico, cujos dados foram coletados em novembro de 2019, com 283 enfermeiros, atuantes em três hospitais universitários do estado do Paraná. Utilizou-se o coeficiente α -Cronbach para determinar a consistência interna, análise fatorial exploratória (AFE) em componentes principais, com rotação Varimax para a validade de construto. A relação entre variáveis observadas e variáveis latentes foi avaliada por meio da Análise Fatorial Confirmatória (AFC).

Resultados: Os participantes tinham idade média de 40 anos, a maioria era casada, do sexo feminino, e mais de 30% tinham título de mestre ou doutor. Na AFE foram eliminados cinco itens (correlação abaixo de 0,30). O modelo final conservou três fatores, explicando 52,2% da variância dos dados, sendo os mesmos

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reinterpretados teóricamente. Na AFC os três fatores apresentaram forte correlação (acima de 0,7), porém mais três itens foram excluídos. Não se confirmou relação de causa e efeito entre os três construtos, mas foi ratificado que os itens são confiáveis para se medir as três novas dimensões após a reinterpretação, pois todas as cargas fatoriais são maiores que 0,5. O instrumento final validado conta com 18 itens distribuídos em três fatores e um α -Conbrach de 0,91.

Conclusão: A escala possui propriedades psicométricas satisfatórias, demonstrando adequadas evidências de validade e confiabilidade.

Resumen

Objetivo: Evaluar la validez del constructo y la fiabilidad interna de la versión brasileña de la escala *Families' Importance in Nursing Care–Nurses' Attitudes* (FINC-NA).

Métodos: Estudio metodológico, cuyos datos fueron recopilados en noviembre de 2019, con 283 enfermeros que trabajan en tres hospitales universitarios del estado de Paraná. Se utilizó el coeficiente α -Conbrach para determinar la consistencia interna, el análisis factorial exploratorio (AFE) en componentes principales, con rotación Varimax para la validez del constructo. La relación entre variables observadas y variables latentes fue evaluada mediante el análisis factorial confirmatorio (AFC).

Resultados: Los participantes tenían una edad promedio de 40 años, la mayoría casada, de sexo femenino y más del 30 % tenía título de maestría o doctorado. En el AFE, se eliminaron cinco ítems (correlación inferior a 0,30). El modelo final conservó tres factores, lo que explica el 52,2 % de la varianza de los datos, que fueron reinterpretados teóricamente. En el AFC, los tres factores presentaron una fuerte correlación (superior a 0,7), pero otros tres ítems fueron excluidos. No se confirmó relación de causa y efecto entre los tres constructos, pero se ratificó que los ítems son confiables para medir las tres nuevas dimensiones después de la reinterpretação, ya que todas las cargas factoriales son mayores a 0,5. El instrumento final validado cuenta con 18 ítems distribuidos en tres factores y un α -Conbrach de 0,91.

Conclusión: La escala tiene propiedades psicométricas satisfactorias y demuestra evidencias de validez y fiabilidad adecuadas.

Introduction

Health care, which allows patients and their families to partner with each other in the health system, has been recommended to improve the safety and quality of life of both.^(1,2) There is growing recognition that families are a comprehensive part of patients' lives and well-being, especially in vulnerable conditions such as hospitalization. Thus, family support and involvement contribute to hospitalized patients to efficiently overcome negative feelings, especially those related to fear and insecurity.⁽³⁾

Due to the proximity and longer stay in the hospital environment, nurses are in a privileged position to promote family involvement in patient care. However, their attitudes and beliefs towards families can help or hinder this practice.⁽⁴⁾

To promote interaction between family and patient, favoring the recovery of the latter, and also improve the nurse-family relationship, as it interferes with the quality of care provided, it is important to identify nurses' attitudes - whether positive or negative - towards the family and the importance of involving it in their clinical practice.⁽⁵⁾ These attitudes can and should even be taken into account when allocating nurses to different sectors of the institution. However, for this distribution to be effective, it is necessary that there are instruments capable of identifying

these attitudes and that they are validated and available for use.⁽⁶⁾

In this sense, a review study compared the psychometric properties of instruments that assess nurses' attitudes regarding the importance of involving families in their clinical practice. The authors concluded that, of the five instruments presented in the 19 studies included in the review, two of them — the revised version of the scale Families' Importance In Nursing Care–Nurses' Attitudes (FINC-NA) and the Family Nurse Practice Scale (FNPS) — achieved higher scores in most properties assessed.⁽⁷⁾

The FINC-NA was developed by a group of Swedish nurses and consists of 26 items, distributed in four dimensions: Family as a resource in nursing care; Family as a conversational partner; Family as a burden; Family as own resource. The answers are presented on a five-point Likert-type scale, whose overall score ranges from 26 to 130 points, in which the higher the score obtained, the more positive is the attitude of nurses towards the family. Its items integrate cognitive (I think...), affective (I feel...) and behavioral (In my work...) dimensions.^(8,9)

The FINC-NA has already been adapted and validated in countries such as Germany,⁽¹⁰⁾ Spain,⁽¹¹⁾ Portugal,⁽¹²⁾ Finland,⁽¹³⁾ Australia,⁽⁴⁾ and the Netherlands⁽¹⁴⁾ and has been frequently used in studies international, to assess nurses' attitudes

towards family involvement in nursing care in different contexts and scenarios.^(5,15-23) The FINC-NA was translated into Portuguese and validated for the context of Portugal in 2011 and later, after a process of semantic equivalence⁽²⁴⁾ started to be used in the Brazilian context. However, it has only recently been adapted to Brazilian culture,⁽²⁵⁾ with a focus on nurses who work in a hospital environment, but its psychometric properties have not yet been tested.

Considering that, in the last five years, studies carried out in Brazil have been published using the Portuguese version of the FINC-NA,^(26,27) or this version, but submitted to verification of semantic equivalence for Brazilian Portuguese,⁽²⁸⁻³¹⁾ it was deemed necessary to carry out the entire process of adapting this instrument to Brazilian culture. Thus, the aim of this study was to assess the construct validity and internal reliability of the Brazilian version of the Families' Importance in Nursing Care-Nurses' Attitudes.

Methods

This is a methodological study that used Pasquali's psychometric assessment proposal as a framework.⁽³²⁾ It is noteworthy that, before starting the process of translation and cultural adaptation of the instrument, the researcher obtained authorization from the two main authors of the instrument.

Data were collected in November 2019 in three university hospitals in the state of Paraná, southern Brazil, located in the cities of Maringá (HUM), Londrina (HUL) and Cascavel (HUOP). For data collection, a week was allocated to each hospital, which occurred in the three work shifts (morning, afternoon and evening). Nurses who met the inclusion criteria participated: acting as a clinical nurse in any service sector or occupying an administrative position, regardless of the work regime. The only exclusion criterion adopted was being on leave or vacation during the period of data collection.

Respectively, the total number of nurses and those who participated in the study consisted, respectively, of HUM = 116 and 97 (83.6%); HUL = 177 and 120 (67.8%); HUOP = 120 and 66 (55%).

For data collection, a self-administered instrument consisting of two parts was used. The first was about sociodemographic characteristics and the second consisted of the Brazilian version of the FINC-NA.⁽²⁵⁾

Data were tabulated in an Excel spreadsheet and analyzed using the Statistical Analysis Software (SAS, version 9.4). In the descriptive analysis, the mean and standard deviation for each item were calculated. The instrument's internal consistency was measured by Cronbach's α coefficient, for which ideal values above 0.7 were considered.

The construct validity of the FINC-NA was assessed by exploratory factor analysis (EFA), after checking the sample adequacy, which used the following criteria: $n > 100$; correlation matrix coefficients with a value above 0.3; Kaiser-Meyer-Olkin (KMO) test with a value above 0.6. The factor extraction method was by principal components (PC), according to the Kaiser criterion. That is, with Eigenvalue greater than one, in addition to analyzing the explained variance.

Factor rotation was performed using the orthogonal Varimax method, keeping items with a minimum loading of 0.3. The estimate of the commonalities (h^2) was calculated, accepting values above 0.3. The commonalities are variability ratio estimators attributed to each variable when extracting the factors and can range from 0 to 1, in which values close to 0 indicate that the factors do not explain the variance. Values close to 1 indicate that all variances are explained by common factors.⁽³³⁾

Confirmatory factor analysis (CFA) was performed with the AMOS 22.0 program using the Maximum Likelihood estimation method. To make a decision about the model adequacy, six adjustment indices were used:⁽³⁴⁾ 1) χ^2/gf - ratio between chi-square and degrees of freedom, whose value must be less than 5 for the model to be acceptable. If less than 2, it is considered a good fit; 2) CFI (comparative fit index) - compares the estimated model with a null or independence model, with values above 0.9 indicating a good fit; 3) GFI (goodness of fit index) - explains covariance ratio, observed between the overt variables, explained by the adjusted model. Values greater than 0.9 indicate

good fit; 4) RMSEA (root mean square error of approximation) - indicates the discrepancy of predicted and observed residuals, if the model is estimated for the population. The fit is considered good in the range [0.08, 0.10] and very good when RMSEA is less than 0.05; 5) PCLOSE - tests fit proximity - it is considered ideal when greater than 0.5; 6) Modification Indices (MI) - used for the specification search when the researcher considers that the model is not statistically acceptable. In these cases, the model can be modified to have a better fit. MI is the value by which the chi-square exact fit index will be decreased (modified) if a certain correlation (covariance) or Betas (regression weights) is added to the model, i.e., if a new constraint is imposed on the data.

This study was approved by the Institutional Review Board of the signatory institution (Opinion 2.853.442) (CAAE (*Certificado de Apresentação para Apreciação Ética* - Certificate of Presentation for Ethical Consideration) 94572918.0.0000.0104). All participants signed the Informed Consent Form.

Results

A total of 283 nurses participated in the research. Of these, 52.5% were over 40 years old; 88.3% were female; 64.0% were married and Catholics; 61.1% had attended a *latu sensu* graduate course; 24.7% held a master's degree; and 7.1% held a doctoral degree. The majority (70.1%) had more than 10 years of training, although there were some with more than 20 years (28.6%).

Regarding professional activity, 72.1% had only one job and 58.3% had worked in a hospital for less than 10 years. Of those who had more than one job, 63.3% worked at another hospital, followed by 16.5%, who worked as professors in technical or undergraduate courses. Finally, the majority (65.0%) reported not working with families in their daily lives.

For the psychometric analysis, the correlation of the 26 items of the instrument was initially verified and Cronbach's α coefficient obtained was 0.87 (almost perfect). The analysis was performed five times, successively, until no item presented a cor-

relation below 0.3, which is the minimum value to be considered ideal.

By excluding item 23 ($r=0.01$), the instrument's reliability improved, as Cronbach's α coefficient increased from 0.87 to 0.88. Therefore, this was the first item removed from the instrument. The next item excluded was 26 ($r=-0.17$) and Cronbach's α coefficient went from 0.88 to 0.89, with a slight improvement in the instrument's internal consistency. Then item 2 was excluded ($r=-0.19$) and Cronbach's α coefficient was changed to 0.90.

When item 8, which had a low correlation, was removed, Cronbach's α coefficient increased from 0.90 to 0.91. Finally, when removing item 1 ($r=0.28$) Cronbach's α coefficient remained 0.91 (almost perfect). With the elimination of the five items that presented a correlation below 0.30. The FINC-NA instrument, Brazilian version, is now composed of 21 items that present a correlation above 0.40 ($r=0.40$) and Cronbach's α coefficient of 0.91.

The second aspect to be assessed was the construct validity, through EFA. When considering all eigenvalues greater than 1 (eigenvalues > 1), three factors were retained. Factor 1 had an eigenvalue of 8.11, with explained variance of 38.7%. Factor 2, with an eigenvalue of 1.47 and a variance of 7.0% and Factor 3, with an eigenvalue of 1.37 and a variance of 6.5%.

The three retained factors together explain 52.2% of the total data variance. The sample presented an adequate size for factor analysis and model fit adequacy was considered acceptable (KMO = 0.9257).

The first factor operationalized by items 4, 5, 6, 7, 10, 11, 15 and 24 explains 38.7% of the total data variability, and was reinterpreted as "Family as an active agent in the care process", representing the most important dimension to explain the phenomenon "nurses' attitudes". The second factor explains 7.0% of the total data variability and was operationalized by items 3, 9, 13, 18, 20, 21, 22 and 25, which was reinterpreted as a constituent of the domain "Family as a motivation in my work". Finally, the third explains 6.5% of the total data variability and was operationalized by items 12, 14, 16, 17 and 19, interpreted as the domain "Promoting family involvement" (Table 1).

Table 1. Loadings generated for the items considered in the nurses' attitude assessment scale (FINC-NA)

		Factor		
		1	2	3
Factor 1	4-Family members should be invited to actively take part in the patient's nursing care.	0.6197	0.0771	0.1149
	5-The presence of family members is important to me as a nurse.	0.6110	0.3626	0.1174
	6-I ask family members to take part in discussions from the very first contact, when a patient comes into my care.	0.6851	0.2862	0.2309
	7-The presence of family members gives me a feeling of security.	0.6722	0.4276	0.0896
	10-The presence of family members eases my workload.	0.6820	0.4020	0.1592
	11 - Family members should be invited to actively take part in planning patient care.	0.6076	0.1732	0.1965
	15-I invite family members to actively take part in patient care.	0.5978	-0.0464	0.5224
	24- I invite family members to speak when planning care.	0.4690	0.1156	0.4495
Factor 2	3- A good relationship with family members gives me job satisfaction.	0.2560	0.5509	-0.0636
	9- Discussion with family members during first care contact saves time in my future work.	0.3434	0.5283	0.1258
	13- The presence of family members is important for the family members themselves.	0.2787	0.5802	0.4063
	18- I consider family members as cooperating partners.	0.1132	0.4337	0.3270
	20- Getting involved with families gives me a feeling of being useful.	0.2032	0.7244	0.1577
	21- I gain a lot of worthwhile knowledge from families that I can use in my work.	0.2033	0.6728	0.2668
	22- It is important to spend time with families.	0.0956	0.7157	0.1656
25- I see myself as a resource for families so they cope as well as possible with their situation.	0.1580	0.4700	0.5114	
Factor 3	12-I always found out what family members a patient has.	0.1919	0.3449	0.5195
	14-I invite family members to have a conversation at the end of the care period.	0.3344	0.0407	0.5669
	16-I ask families how I can support them.	0.1819	0.3172	0.6505
	17-I encourage families to use their own resources so that they have the optimal possibilities to cope with situations by themselves.	0.1177	0.0413	0.7181
	19-I invite family members to speak about changes in the patient's condition.	0.0523	0.3220	0.5450

When estimating the commonalities of all items of the three factors, it was found that item 13, of Factor 2, had the lowest (0.30792), and item 10 of Factor 1, the highest commonality (0.65212). Table 2 presents information from the original scale and the scale adapted to Portuguese after EFA.

For CFA, considering the MI, the first correlation observed was between items 13, retained in the second factor (F2_13), and item 14, retained in the third factor (F3_14). Since they belong to different factors, it was not possible to correlate them and, therefore, they were removed. A higher modification index was observed between item 15, retained in Factor 1 (F1_15), and Factor 3, which suggested

Table 2. Comparison between the original instrument and the adapted one after EFA, with number of items in each domain and Cronbach's α coefficient values

Scale	Domains	n° of items	Cronbach's α
Original scale domains	1 - Family as a resource in nursing care	10	0.8680
	2 - Family as a conversational partner	8	0.7874
	3 - Family as a burden	4	0.6169
	4 - Family as own resource	4	0.7874
	Total	26	0.9192
Adapted scale factors	1 - Family as an active agent in the care process	8	0.8641
	2 - Family as a motivation in my work	8	0.8249
	3 - Promoting family involvement	5	0.7609
	Total	21	0.8757

the removal of item F1_15. After these modifications, the structural model was confirmed only with the correlations between the domains (Figure 1). With regard to psychometric properties, CFA revealed satisfactory results for all adjustment indices presented. It is observed, in figure 1 (CFA), a strong correlation between the three constructs: Factor 1 and Factor 2 ($r = 0.81$), Factor 2 and Factor 3 ($r = 0.82$) and Factor 1 and Factor 3 ($r = 0.70$). Thus, it is stated that the scale reliability ($R^2 > 0.25$) is adequate to measure nurses' attitudes towards the family, as all loadings were greater than 0.5 ($\lambda \geq 0.5$).

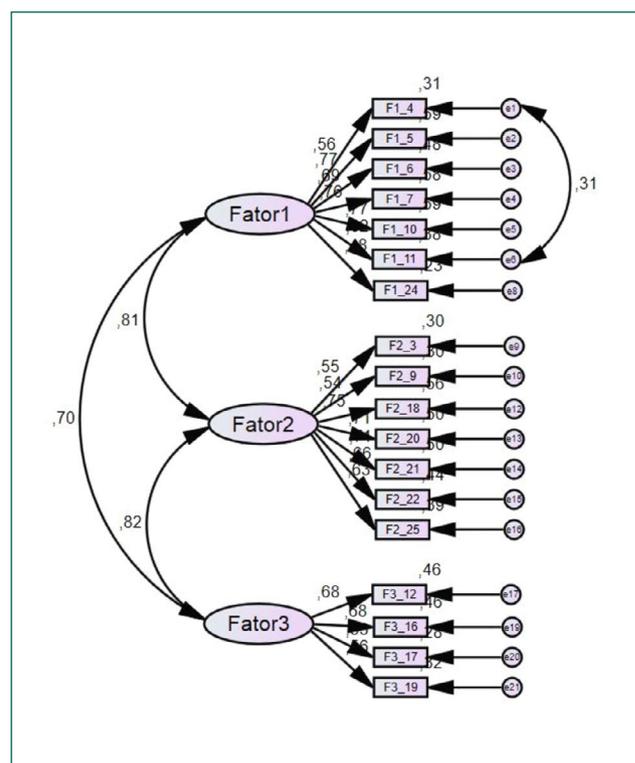


Figure 1. Structural model for nurses' attitudes towards the family

Discussion

The FINC-NA psychometric tests, applied to a sample of Brazilian nurses working in public teaching hospitals, determined the removal of eight items and the reorganization of three factors.

Based on the commonalities, all factors explained the variability of the retained items. In the first factor, except for item 24 (commonality = 0.44), all other items explained the greatest variability achieved, as they presented commonalities around 0.60. This was expected, as this is the most important factor to explain the variety of data (38.66%). It is noteworthy that this result is similar to that found in the German version of FINC-NA.⁽¹⁰⁾ In the second factor, the items also presented high commonalities, except for 9, which presented commonality = 0.41297. In Factor 3, of the five items, two had commonalities lower than 0.50.

When comparing the first domain of the original scale with the first factor of the adapted scale, it is observed that Cronbach's coefficients and correlations between items were important and of the same magnitude, and five items (4,5,7,10 and 11) were common on both scales. Thus, some items were relocated, giving a new conformation to the instrument, which became constituted by three factors, which were reinterpreted and titled in order to better represent the items that constituted them. This type of action corresponds to the literature regarding the validation of the FINC-NA in other countries, because in EFA, the items needed to be reorganized and different names were assigned to the new factors.^(4,12-14)

This result is similar to that identified in the validation of FINC-NA, in Portugal, which also retained three factors,⁽¹⁴⁾ however, with a different disposition from what occurred in the present study, in relation to the distribution of items in the factors. Other countries that validated the FINC-NA maintained four factors in the instrument, however, with a factor structure different from the original instrument.^(4,10-12,14)

When comparing the second domain of the original scale with the second factor of the adapted scale, it is observed that only item nine was

common. However, Factor 2 had a better value of Cronbach's α coefficient and better inter-item correlations in relation to the other two domains of the original scale.

The third domain of the original scale, "Family as a burden", was eliminated in the instrument's first refinement phase, i.e., during EFA. Originally, this domain already had two items (2 and 8) with an indication of elimination, as they presented low inter-item correlations. ($r < 0.40$). As all items in domain "three" were eliminated in the instrument's refinement phase, there is no common item between domain three of the original scale and Factor 3. In fact, Cronbach's α coefficient of this factor was higher, and its reinterpretation was similar to that obtained in the Australian validation.⁽⁴⁾

All items had loads ≥ 0.43 . These results are similar to those of the study carried out in the Netherlands, whose loadings for the items were ≥ 0.42 ,⁽¹⁶⁾ therefore, higher than those found in the validation carried out in Australia, which obtained four items with lower loadings (< 0.32).⁽⁴⁾ According to the authors of the validation carried out in the Netherlands, these differences may reflect the cultural diversity that exists between countries.⁽¹⁶⁾

With the exclusion of the five items proposed in EFA, the correlations between items (r) and Cronbach's α coefficients were better in the adapted scale than at the beginning of refinement, which justifies the elimination of the five items in question. A validation study of the FINC-NA for Portuguese culture found a structure different from the original with only three factors, in which the latter had a low Cronbach's coefficient (0.49) and the total explained variance was only 47.79%.⁽¹²⁾ According to the authors, this implies the need to create other domains to explain Portuguese nurses' attitudes.

The Spanish version of the FINC-NA maintained the four factors with the same number of items as the original scale (26); however, the items present in the fourth factor were redistributed to the other factors, so that Factor 4 in this version is now composed of only two items.⁽¹¹⁾ In total, the explained variance of the FINC-NA in Spain (54.2%)⁽¹¹⁾ was close to that achieved in the Brazilian version (52.2%).

After excluding three more items, CFA ratified the factor structure of the retained items, but did not explain how the dependency relationships between the new factors occur. It is important to note that, in other countries, where the FINC-NA was validated, CFA was not performed.^(4,10-14)

Among the items retained in EFA, all had high commonalities (≥ 0.4). However, it is possible that when applying this instrument to other populations of nurses, the same results are not observed, considering the specificities of the study sample, as 24.7% of the nurses held a master's degree and 7% held a doctoral degree. It is noteworthy that in the study that validated the FINC-NA in Australia, only 10.4% of nurses held a master's or a doctoral degree,⁽⁴⁾ and in Portugal, only 2.2% held a master's degree.⁽¹²⁾ Another important aspect to be considered is that the instrument was self-applied and this can lead to biased responses. However, since its creation and in all versions adapted for other countries, this was generally the way in which the instrument was applied.^(4,10-12)

Based on the results obtained with the sample of Brazilian nurses from public hospitals, the items that make up the adapted and validated version of the FINC-NA proved to be reliable for measuring the three new dimensions/factors proposed in the Brazilian version. However, the theoretical idea of the original instrument, represented in four dimensions, was not confirmed, as in the validation study developed in Portugal.⁽¹²⁾

In any case, the FINC-NA version is an opportunity for continued research in the area of measuring nurses' attitudes, especially in the provision of sensitive care to families. Regarding this, and in order to improve the instrument, for future research, its review is suggested, with the addition of domains/factors that include important concepts to be considered in the care of the family unit.

The incorporation of other aspects that can further favor the assessment of nurses' attitudes towards the families of hospitalized patients, such as aspects related to nurses' quality of life and socioeconomic conditions, are also important issues. This is because the three factors retained in EFA explained 52.2% of the total data variability, and, according to the literature,⁽³⁵⁾ it is necessary that at least 70% of the

total variance be explained by the main instrument components. It is important to highlight that, in addition to "attitude" being considered a phenomenon difficult to measure⁽³⁵⁾ in social sciences, a value of 60% of total variance is considered good.⁽³³⁾

A possible limitation of this study refers to the characteristic of the sample, as all professionals worked in public hospitals, with established career plans, which justifies the proportion of nurses with *stricto sensu* graduate degrees, which is much higher than that found in private institutions. It is noteworthy that, currently, hospitals are facing a lot of difficulty in hiring professionals from all areas, through public tender, and for this reason they have a large number of temporary employees, which, in turn, justifies the proportion of professionals with two employment relationships and those who work overtime.

Conclusion

The Brazilian version of the FINC-NA, with 18 items distributed into three factors, has satisfactory psychometric properties, demonstrating adequate evidence of validity and reliability.

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Collaborations

Ruiz AGB, Marcon SS, contributed to the project design, data collection and analysis, writing, relevant content review, article formatting and approval of the version to be published. Kalinke LP, Haddad MCFL, Schwartz E, Teston EF, Santos VEP contributed to writing, content review and approval of the version to be published. Silva ES contributed to data analysis and interpretation and content review.

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