

PSYCHOMETRIC PROPERTIES OF INSTRUMENT ASSESSING NURSING CARE PROVIDED TO INDIVIDUALS WITH HIV/AIDS

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ABSTRACT

Objective: to assess the psychometric properties of the Brazilian version of Quality of Care Through the Patient's Eyes – HIV (QUOTE-HIV).

Method: this methodological study consisted of verifying and assessing convergent and structural validity and estimating the reliability of the instrument's translated and culturally adapted version. It was conducted in an HIV/AIDS referral center between August and November 2016 and included 141 participants. Confirmatory factor analysis was performed to assess structural construct validity, while Cronbach's alpha and composite reliability were performed to assess the internal consistency of each domain and estimate the instrument's reliability. Convergent construct validity was verified using Spearman's coefficient correlation.

Results: QUOTE-HIV is structured on two components, Importance and Performance; hence, two models were generated at the end of the factor analysis, one for each component. Both models were statistically validated and presented satisfactory reliability parameters. Regarding convergent validity, positive and significant correlations were found between the scores obtained by the QUOTE-HIV domains and the Newcastle Satisfaction with Nursing Scales (NSNS), except for the performance domain in the importance component.

Conclusion: QUOTE-HIV Brazilian version presented evidence of reliability, adequate internal consistency, and validity according to the convergent and structural construct validity methods adopted.

DESCRIPTORS: Validation study. Nursing care. HIV. Factor analysis, statistical. Quality of health care.

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PROPRIEDADES PSICOMÉTRICAS DE INSTRUMENTO QUE AVALIA ASSISTÊNCIA DE ENFERMAGEM PRESTADA ÀS PESSOAS COM HIV/AIDS

RESUMO

Objetivo: avaliar as propriedades de medida da versão brasileira do *Quality of Care Through the Patient's Eyes – HIV (QUOTE-HIV)*.

Método: estudo metodológico que consistiu na verificação e avaliação da validade de construto convergente e estrutural e na estimativa da confiabilidade de instrumento traduzido e adaptado culturalmente. Foi realizado em um centro de referência para HIV/AIDS no período de agosto a novembro de 2016 e contou com a participação de 141 sujeitos. Para avaliar a validade de construto estrutural, aplicou-se análise fatorial confirmatória. Para estimar a confiabilidade, foi avaliada a consistência interna de cada domínio do instrumento por meio do Alpha de Cronbach e da confiabilidade composta. A validade de construto convergente foi verificada por meio do coeficiente de correlação de Spearman.

Resultados: como o instrumento QUOTE-HIV está estruturado em duas partes, importância e desempenho, foram gerados dois modelos ao final da análise fatorial, um para cada parte, ambos validados estatisticamente. Em ambas as partes foram observados valores de confiabilidade satisfatórios. Em relação à validade convergente, foram observadas correlações positivas significativas entre os escores dos domínios do QUOTE-HIV e o escore total do *Newcastle Satisfaction with Nursing Scales (NSNS)*, exceto para o domínio desempenho do profissional no componente importância.

Conclusão: a versão brasileira do QUOTE-HIV apresentou evidências de confiabilidade, com adequada consistência interna e validade, de acordo com os métodos de validade de construto convergente e estrutural empregados.

DESCRITORES: Estudos de validação. Cuidados de enfermagem. HIV. Análise fatorial. Qualidade dos cuidados de saúde.

PROPIEDADES PSICOMÉTRICAS DE INSTRUMENTO QUE EVALÚA LA ASISTENCIA DE LA ENFERMERÍA PRESTADA A PERSONAS CON HIV/SIDA

RESUMEN

Objetivo: evaluar las propiedades de medida de la versión brasileña del *Quality of Care Through the Patient's Eyes – HIV (QUOTE-HIV)*.

Método: estudio metodológico que consistió en la verificación y evaluación de la validez de constructo convergente y estructural y en la estimativa de la confiabilidad del instrumento traducido y adaptado culturalmente. Fue realizado en un centro de referencia para HIV/SIDA en el período de agosto a noviembre de 2016 y contó con la participación de 141 sujetos. Para evaluar la validez de constructo estructural, se aplicó análisis factorial confirmatorio. Para estimar la confiabilidad, fue evaluada la consistencia interna de cada dominio del instrumento por medio del *Alpha de Cronbach* y de la confiabilidad compuesta. La validez de constructo convergente fue verificada por medio del coeficiente de correlación de *Spearman*.

Resultados: como el instrumento QUOTE-HIV está estructurado en dos partes, importancia y desempeño, fueron generados dos modelos al final del análisis factorial, un para cada parte, ambos validados estadísticamente. En las dos partes fueron observados valores de confiabilidad satisfactorios. En relación a la validez convergente, fueron observadas correlaciones positivas significativas entre los puntajes de los dominios del QUOTE-HIV y el puntaje total del *Newcastle Satisfaction with Nursing Scales (NSNS)*, excepto para el dominio desempeño del profesional en el componente importancia.

Conclusión: la versión brasileña del QUOTE-HIV presentó evidencias de confiabilidad, con adecuada consistencia interna y validez, de acuerdo con los métodos de validez de constructo convergente y estructural empleados.

DESCRIPTORS: Estudio de validación. Atención de enfermería. HIV. Análisis factorial. Calidad de atención de salud.

INTRODUCTION

The acquired immunodeficiency syndrome (AIDS) caused by the human immunodeficiency virus (HIV) stands out among infectious diseases due to its magnitude and extent of the damage caused¹. Adequate care and early diagnosis are essential to decrease disease-related morbidities and mortality. However, one of the biggest challenges for services and professionals providing care to people with HIV is to ensure patients access the services and maintain pharmacological adherence, a worldwide quest.²⁻³ Assessing and understanding the patients' specific difficulties and needs as well as the quality of care provided by health workers can guide the actions implemented in health services⁴.

There is a lack of instruments in the Brazilian context to assess such needs. For this reason, a questionnaire developed to identify the perspective of individuals with HIV infection regarding care delivery was sought in the international literature. This search resulted in the QUOTE-HIV⁵, an instrument assessing the quality of care from the perspective of individuals with HIV infection. Before this study, the QUOTE-HIV was translated and culturally adapted for Brazilian HIV-infected individuals⁶, according to the guidelines provided in the literature for the cultural adaptation and content validation of instruments⁷. The literature also emphasizes the importance of assessing the measurement properties of culturally adapted instruments to ensure the safety and reliability of data collected in investigations and used in clinical practice⁸⁻⁹.

The method used to assess the measurement properties of an instrument depends on the type of study and information needed, considering the statistical analyzes adopted⁸. There are tools currently available in the literature based on analyses and expert consensus to help clarify and standardize the terminology and definitions related to measurement properties¹⁰. This study's objective was to assess the measurement properties of the QUOTE-HIV version adapted to the Brazilian population with HIV infection by identifying its structural and convergent validity and reliability.

METHOD

This methodological study verified and assessed structural and convergent construct validity of the adapted instrument and estimated its reliability. It was developed in the teaching health facility of an HIV/AIDS referral center located in the interior of São Paulo, Brazil. The institution is characterized by the care provided by a multidisciplinary team under the Brazilian Health System (SUS).

The following inclusion criteria were adopted: a) being HIV positive; b) receiving HIV/AIDS specialized outpatient care for at least one year; c) being 18 years old or older, and d) being able to understand and answer the instrument's questions.

All those who attended a previously scheduled medical appointment during the data collection period and met the inclusion criteria were included in this study. A proportion of five to ten participants was considered for each instrument's items to determine the sample size and enable the confirmatory factor analysis. Therefore, at least 115 subjects would be needed;¹¹ a sample of 141 participants was established.

One of the authors and the nurse in the referral center applied the instruments and collected data from August to November 2016. The training was provided to standardize how the patients would be approached, and the questionnaires applied. The participants received clarification regarding the study's objectives and signed free and informed consent forms. Data were collected individually in a private room.

The participants answered questions concerning the demographic and clinical characterization, the QUOTE-HIV adapted version, and the Brazilian version of the Newcastle Satisfaction with Nursing Scales (NSNS).

Socio-demographic and clinical characterization form

A socio-demographic and clinical form was developed to address the following information: sex, marital status, religion, age, education, profession, monthly family income, viral load, CD4 count, and disease staging.

QUOTE-HIV adapted version

This instrument was developed to measure the quality of nursing care from the patients' perspective. Its items are rated on a Likert scale: Not important = 1; Little important = 2; Important = 3; and Very important = 4. The workers' performance is rated according to the following: Never = 1; Sometimes = 2; Often = 3; and Always = 4. It comprises 23 items distributed into three domains: professional performance (seven items), professional attitude (seven items), and care organization (nine items). These items are assessed for two reasons: first, to obtain data regarding the importance assigned to each item, and second, to assess the performance of care providers. Data can be assessed by considering each item individually or the score obtained in each domain, dividing the score assigned to the professional performance by the importance assigned by the patients. Scores higher than or equal to 1 indicate that care was deemed adequate. Lower scores suggest a need for improvements according to the patients' perspective^{5,12}.

Newcastle Satisfaction with Nursing Scales (NSNS): Brazilian version

This scale assesses the experiences and satisfaction of patients with nursing care. It is composed of two scales that can be assessed independently: the scale of patient's experiences with nursing care and the scale of patient satisfaction with nursing care, with 26 and 19 items, respectively. The items are rated on a 7-point and 5-point Likert scale, respectively, with the scores for each subscale ranging from 0 to 100. The higher the score, the more positive a patient's experiences are, and the more satisfied s/he is with nursing care. In this study, we used the Brazilian version of the scale measuring patient satisfaction with nursing care¹³.

Data were initially typed in a Microsoft Office Excel 2010 spreadsheet and later submitted to statistical analysis using the Statistical Analysis System (SAS) software, version 9.4 and Smart PLS 3.2.1.

A descriptive analysis to characterize the participants was performed for the continuous variables, and a frequency table was created with absolute values (n) and percentages (%) for the categorical variables.

Structural construct validity

A confirmatory factor analysis was performed to assess structural construct validity, considering the partial least squares estimation method (PLS). The factor analysis comprised two steps: analysis of convergent validity and discriminant validity of the models proposed.

The Average Variance Extracted (AVE) results were first assessed for each of the model's domains to analyze convergent validity. AVE values higher than 0.5 indicate that the model converges to a satisfactory result¹⁴. The factor loadings between the items and their respective domains were assessed, and items with loadings below 0.5 were candidates to leave the factor model. Factor loadings should be at least greater than 0.5; ideally higher than 0.7¹⁴.

The discriminant validity was first assessed using the Fornell-Larcker criterion¹⁵. This method compares the AVE's square roots with the correlations between the domains. The model presents discriminant validity if the AVE's square roots are higher than the correlations between the domains. Discriminant validity was also assessed by cross-loading analysis. An instrument has discriminant validity if its items present a higher factor loading in the domain in which they were previously assigned than in the others.

As the QUOTE-HIV comprises the importance and performance components in its structure, analyses were performed for both, although the original instrument⁵ only uses the importance component in its analyses. Thus, two validated models remained at the end of the study, one for each part, both statistically validated.

In order to establish which version would better assess the nursing care provided to HIV-infected individuals, we first gathered and exhaustively evaluated each of the instrument's versions without knowing the values obtained in the statistical analyses to avoid choice bias. Next, the confirmatory factor analysis results and convergent construct validity were compared. Therefore, the best version of the QUOTE-HIV instrument was determined based on these qualitative and quantitative assessments.

Convergent construct validity

Convergent construct validity was verified considering the correlation between the scores obtained in the instrument's three domains and the total score of the NSNS Brazilian version; the Spearman correlation coefficient was used. Coefficients between 0.1 and 0.29 were considered weak; between 0.30 and 0.49 moderate; and above than or equal to 0.50 corresponded to strong correlations¹⁶. A significance level of 5% was adopted in these analyses.

Reliability

Reliability was estimated by verifying the internal consistency of the instrument's domains using Cronbach's Alpha and composite reliability to check if the instrument's items were homogeneous. Values above 0.70 were considered evidence of satisfactory internal consistency¹¹.

This study complied with the ethical guidelines provided by Resolution 466/2012, Brazilian National Health Council/Ministry of Health – CNS/MS.

RESULTS

A total of 141 volunteers, aged 41 years on average, attending the HIV/AIDS referral service for 9.45 years, with approximately 10 years of schooling and a monthly income of 2 to 4 times the minimum wage (31.91%) participated in the study. The other characteristics of the participants can be seen in Table 1.

Table 1 – Participants' characterization. Campinas, SP, Brazil, 2016. (n=141).

Variables	n	%
Education		
Incomplete middle school	29	20.57
Middle school	35	24.82
Incomplete high school	10	7.09
High school	40	28.37
Vocational school	05	3.55
College	22	15.60
Marital Status		
Married	45	31.91
Single	52	36.88
Separated/divorced	22	15.60
Widowed	12	8.51
Cohabiting	10	7.09
Gender		
Male	83	58.87
Female	58	41.13
Religion		
Catholic	63	44.68
Evangelic	39	27.66
Protestant	04	2.84
No religion	35	24.82
Income – Minimum Wage		
<=1	20	14.18
>1 and <=2	39	27.66
>2 and <=4	45	31.91
>4 and <=6	11	7.80
>6	26	18.44
Viral load		
Undetectable	86	60.99
More than 50 copies/ml	55	39.01
T-CD4 count		
More than 500/mm	60	42.55
200-500/mm	36	25.53
100-200/mm	28	19.86
50-100/mm	07	4.96
Lower than 50/mm	10	7.09

Structural construct validity

Confirmatory factor analysis was performed based on the domains of the instrument's original model, considering both the importance and performance components.

Initially, the model's convergent validity was assessed, verifying the factor loadings and the AVE values obtained for the domains. Items with factor loadings or AVE lower than 0.5 were deleted from the structural model. Then, the models were re-estimated, with the factor loadings and AVE reassessed whenever a new item was eliminated. Items 1,2,3,5,6,7,14,17,18,21, 22 from the Importance component and 5,16,21, and 23 from the Performance component were eliminated according to convergent validity criteria.

Next, the model's discriminant validity was assessed by comparing the AVE's square roots with the correlations between the domains and by assessing the items' cross-loadings to determine the final structural model. Finally, items 10 from the Importance component and 2,7,8,12,13, and 15 from the Performance component were eliminated.

After assessing discriminant validity criteria, the final models of importance (Figure 1) and performance (Figure 2) were obtained.

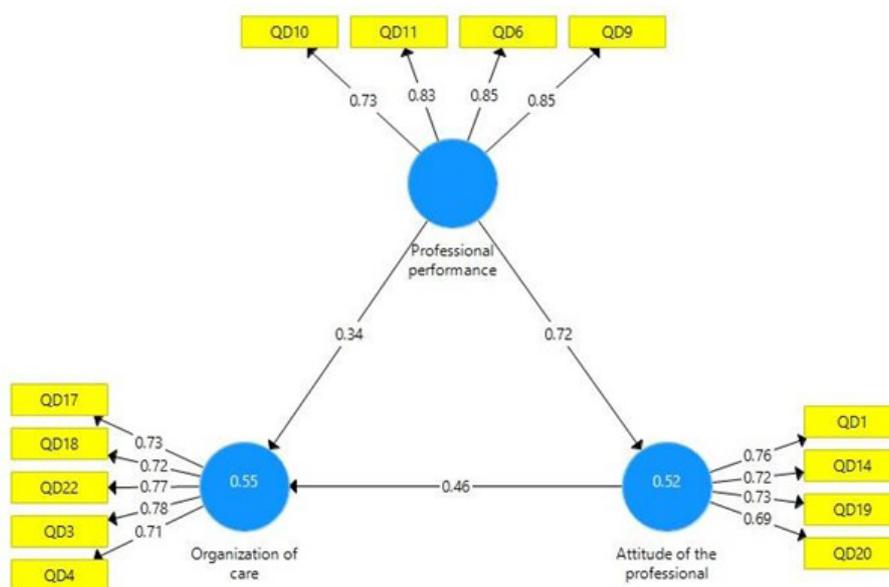


Figure 1 – QUOTE-HIV final factorial model for the *Importance* component. Campinas, SP, Brazil, 2016.

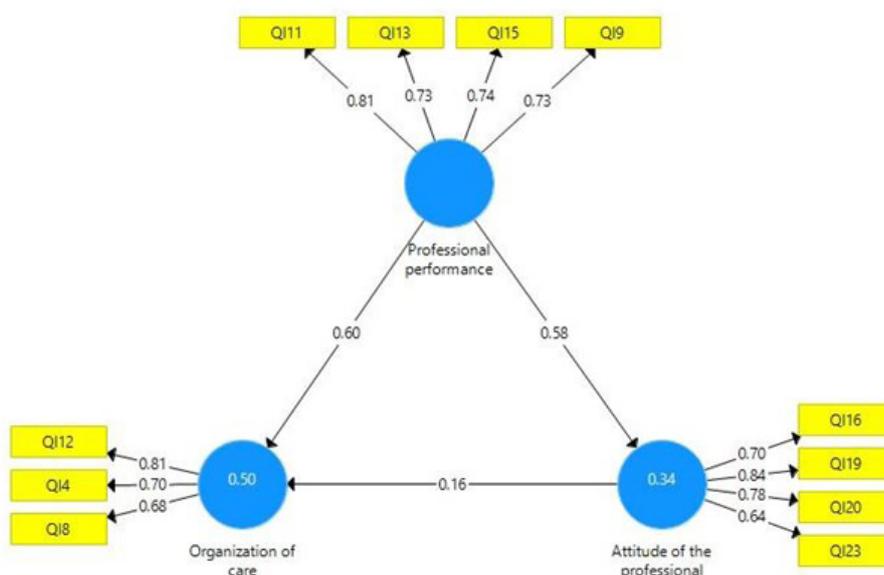


Figure 2 – QUOTE-HIV final factorial model for the *Performance* component. Campinas, SP, Brazil, 2016.

Reliability

After the factor analysis, the QUOTE-HIV internal consistency, assessed through composite reliability and Cronbach's alpha, was considered adequate in all domains concerning Performance (Cronbach's alpha and Composite Reliability >0.70). On the other hand, regarding the Importance component, the care organization domain presented a Cronbach's alpha <0.70. Table 2 presents the reliability and AVE values for the final models of each of the components and their respective domains.

Table 2 – AVE, Cronbach's alpha, and Composite Reliability for the final structural models of QUOTE-HIV. Campinas, SP, Brazil, 2016.

Instrument's components/ domains	AVE	Composite Reliability	Cronbach's alpha
<i>Importance</i>			
Professional's attitude	0.552	0.830	0.729
Professional performance	0.567	0.839	0.745
Care organization	0.535	0.774	0.581
<i>Performance</i>			
Professional's attitude	0.527	0.816	0.703
Professional performance	0.668	0.889	0.834
Care organization	0.547	0.858	0.793

Convergent construct validity

Convergent construct validity, assessed by the correlation of the scores obtained in the QUOTE-HIV domains and the NSNS' total score, was significant in all the correlations in the instrument's *performance* component. Regarding the importance component, the domain "professional performance" did not present a significant correlation (p-value = 0.0662) (Table 3).

Table 3 – Spearman's correlation coefficients between the scores obtained in the QUOTE-HIV domains and the NSNS total score. Campinas, SP, Brazil, 2016.

QUOTE-HIV * Score per domain	NSNS † Total Score	
	(r) ‡	p-value
<i>Importance</i>		
Professional's attitude	0.3008	0.0001
Professional performance	0.1552	0.0662
Care organization	0.3338	0.0001
<i>Performance</i>		
Professional's attitude	0.4053	0.0001
Professional performance	0.3054	0.0002
Care organization	0.3178	0.0001

* Quality of Care Through the Patient's Eyes – HIV; † Newcastle Satisfaction with Nursing Scales; ‡ Spearman's Rank Correlation Coefficient

Regarding the magnitude of correlations, all the Performance's domains presented moderate positive correlation. Regarding the Importance component, the correlations were also of moderate positive magnitude for the domains with significant correlation.

DISCUSSION

Regarding the participants' characteristics, the mean age was 41 (SD=10.54) and 9.45 years (SD=7.14) was how long the participants attended the service, a period that ranged from 1 to 33 years, showing the sample's heterogeneity; an aspect observed in other Brazilian HIV/AIDS referral services, given the epidemic's dynamic profile¹⁷⁻¹⁸.

At the end of the confirmatory factor analysis process, two culturally adapted final versions of the QUOTE-HIV instrument were obtained, one for the Importance component and one for Performance. A qualitative and quantitative assessment was performed to determine which of the versions would be considered the definitive Brazilian version¹⁹.

The instruments' composition was assessed item by item in the qualitative analysis to ensure greater specificity and verify each item's representativeness in the nursing care provided to individuals with HIV infection. The qualitative assessment's objective was to seek the meaning of each item, focusing on the specificities of the group being assessed¹⁹⁻²⁰.

As part of this assessment, the number of items that composed each version was verified, with the version based on the Performance domain containing 13 items and the version based on the Importance domain containing 11 items. Next, coincident questions were identified, with five identical items in both instruments.

The next step was to verify if the questionnaires had different questions but with a certain similarity regarding the topic under study. Two questions of the performance model – “The nursing staff informs me about the pros and cons of a treatment” and “The nursing staff gives me information about possible side effects of drugs” – and a question of the Importance model. – “The nursing staff explains my medications clearly” – were essentially concerned with the treatment provided to individuals with HIV infection and, therefore, choosing one model or the other would not harm an investigation of the quality of nursing care regarding the guidelines established for the treatment provided to these individuals^{4, 20}.

Antiretroviral therapy's effectiveness in treating people with HIV infection is already well established in the scientific literature, but such effectiveness depends mainly on patients' adherence to the antiretrovirals²⁰. The factors that influence adherence to antiretroviral therapy are related to the individuals, the presence of comorbidities, the drugs prescribed, and the quality of care provided in the health services where an individual is assisted. Providing opportunities for patients and health workers to discuss the main problems faced in HIV treatment can be an essential strategy for improving adherence²¹.

Once identical and similar items were identified in the instrument's versions, we carefully assessed and compared the remaining questions in both questionnaires. Therefore, relevant aspects in the nursing care provided to individuals with HIV infection, which the instrument was supposed to assess, were considered²²⁻²³. Thus, considering the domains composing the original instrument, we assessed which of the instrument's versions had a set of questions that best investigated “care organization,” “nursing professional's attitude,” and “professional performance.” The conclusion is that the questions of the model based on the Performance component met the study's demands - both in quantity and quality terms¹⁹.

There is evidence in the literature that the results of the care provided to patients, as well as their satisfaction with care delivery, are directly related to the way in which nursing professionals organize care²².

Therefore, the care provided by nursing professionals cannot be restricted to its technical aspect but also be expressed through attitudes and by the relationship established with the care receiver. Nursing professionals should allow patients to talk about their feelings and doubts so that they can obtain the necessary guidelines and information and be able to understand information²³.

The quantitative assessment was the next step, and the statistical analyses were considered in the decision-making process. The factor analyses for the Importance and Performance components showed satisfactory convergent and discriminant validity.

As for the reliability of the instrument's versions, the model based on the Performance component showed adequate internal consistency (at the end) for all its domains, while Cronbach's alpha was not adequate (<0.70) for the domain "care organization" from the version based on the Importance component.

The model based on the Performance component showed significant results in convergent construct validity analysis for all correlations performed with the NSNS. On the other hand, the version based on the Importance component did not present a significant correlation between professional performance and the NSNS instrument.

Considering both qualitative and quantitative analyses of the QUOTE-HIV final versions, based on the structural modeling in the confirmatory factor analysis, the decision was that the instrument that would best assess the quality of care provided to individuals with HIV infection was the one based on the Performance component. This instrument comprises 13 items distributed in the exact three domains as the original version, namely: professional's attitude (items 1,8,11, and 12), professional performance (items 4,5,6, and 7), and care organization (2,3,9, 10 and 13).

The QUOTE-HIV Brazilian version was sent to the authors of the original instrument, who approved its structure and final composition and its use to assess the nursing care provided to HIV-infected individuals in Brazil.

This study's limitation concerns the fact that an instrument's reliability and validity are not fixed properties and, therefore, vary according to the circumstances, population, and objective. A reliable instrument for several situations may not present the same reliability in different circumstances; hence, its measurement characteristics should constantly be tested²⁴⁻²⁵.

CONCLUSION

According to the convergent and structural construct validity methods performed here, the QUOTE-HIV Brazilian version presented evidence of reliability, with adequate consistency and internal validity.

The final QUOTE-HIV model showed significant results in the convergent construct validity analysis for all the correlations performed with the Newcastle Satisfaction with Nursing Scales (NSNS). In addition, all the domains showed a moderate positive correlation regarding the magnitude of correlations.

Regarding the reliability verification, the QUOTE-HIV internal consistency, assessed through composite reliability and Cronbach's alpha, was considered adequate in all domains.

This study can contribute to the Brazilian literature as it presents an instrument with evidence of reliability and validity to assess the perspective of individuals with HIV infection concerning the quality of nursing care delivery.

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NOTES

ORIGIN OF THE ARTICLE

Article extracted from the the thesis – *Adaptação cultural e validação do quality of care through the patient's eyes - HIV (QUOTE-HIV) para população brasileira que vive com HIV/AIDS*, presente to the Programa de Pós-Graduação em Enfermagem, Faculdade de Enfermagem, Universidade Estadual de Campinas, in 2016.

CONTRIBUTION OF AUTHORITY

Study's design: Lima TC, Freitas MIP.

Data collection: Lima TC, Ito VS.

Data analysis and interpretation: Lima TC, Freitas MIP, Oliveira HC.

Discussion of results: Lima TC, Freitas MIP.

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Final version's review and final approval: Alexandre NMC, Freitas MIP.

APPROVAL OF ETHICS COMMITTEE IN RESEARCH

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CONFLICT OF INTEREST

There is no conflict of interest.

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SUPPLEMENTARY MATERIAL

The following online material is available for this article:

QUOTE-HIV - versão brasileira.

