Translation, cross-cultural adaptation and validation of a telemedicine satisfaction questionnaire

Tradução, adaptação transcultural e validação de questionário de satisfação em telemedicina

Traducción, adaptación transcultural y validación de cuestionario de satisfacción en telemedicina

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Abstract

Introduction: Telemedicine facilitates the care in health by distance. This health technology has shown good clinical results and user satisfaction. The satisfaction is a main indication of service quality, your evaluation allows changes in the quality of care, identifies problems and enables better management and behaviors of health professionals. The increase in the use of telemedicine in the world has emerged in a need to understand the quality of this service. **Objective:** To translate, culturally adapt and validate a questionnaire to assess the satisfaction of patients treated by telemedicine. **Methods:** The version adapted after evaluation by a committee of judges was used in a pre-test with 30 patients seen in the project. The results of the pre-test were evaluated in order to obtain an adequate version of the instrument. In addition, this questionnaire was applied to a sample of 141 patients treated via telemedicine. Analysis of internal consistency and construct validation were performed. **Results:** The Global Content Validity Coefficient (CVC) score was 0.942, demonstrating the questions' clarity, relevance and relevance. The instrument showed internal consistency with a standardized Cronbach's alpha of 0.6; considered acceptable. The exploratory factor analysis showed a KMO of 0.56 and Bartlett's sphericity test showed a value of 0.001. **Conclusions:** The Brazilian version of the Questionnaire for the Evaluation of Patient Satisfaction Via Telemedicine (QAS-Tele) is an easy and viable instrument for the evaluation of the satisfaction of patients treated by telemedicine.

Keywords: Patient satisfaction. Telemedicine. Validation study. Surveys and questionnaires.

Resumo

Introdução: A telemedicina facilita o acesso ao cuidado para os pacientes. Essa tecnologia tem apresentado bons resultados clínicos e de satisfação dos usuários. A satisfação é um dos principais indicadores de qualidade dos serviços, e sua avaliação permite mudanças na qualidade da prestação de cuidados, identifica problemas e viabiliza a melhor gestão e os melhores comportamentos dos profissionais de saúde. Do aumento do uso da telemedicina no mundo emergiu a necessidade de entendimento da qualidade desse serviço. **Objetivo:** Traduzir, adaptar culturalmente e validar um questionário para avaliação da satisfação de pacientes atendidos por telemedicina. **Métodos:** A versão adaptada após a avaliação por um comitê de juízes foi utilizada em pré-teste com 30 pacientes atendidos no projeto TeleOftalmo. Os resultados do pré-teste foram avaliados a fim de se obter uma versão adequada do instrumento. Além disso, o instrumento foi aplicado em uma amostra de 141 pacientes atendidos via telemedicina. Análises de consistência interna e de validação de constructo foram realizadas. **Resultados:** O coeficiente de validade de conteúdo (CVC) global foi 0,942, demonstrando clareza, pertinência e relevância das questões. O instrumento apresentou consistência interna com alfa de Cronbach estandardizado de 0,6, considerado aceitável. A análise fatorial exploratória apresentou critério de Kaiser-Meyer-Olkin de adequação de amostragem de 0,56 e o teste de esfericidade de Bartlett apresentou valor de 0,001. **Conclusões:** A versão brasileira do Questionário de Avaliação da Satisfação de Pacientes Atendidos via Telemedicina (QAS-Tele) é um instrumento fácil e viável para a avaliação da satisfação dos pacientes atendidos por telemedicina.

Palavras-chave: Satisfação do paciente. Telemedicina. Estudos de validação. Inquéritos e questionários.

Resumen

Introducción: La telemedicina facilita el acceso a la atención a los pacientes. Esta tecnología ha demostrado buenos resultados clínicos y en la satisfacción de los usuarios. La satisfacción es uno de los principales indicativos de la calidad de los servicios, su evaluación permite cambios en la calidad de la atención, identifica problemas y posibilita mejor gestión y comportamiento de los profesionales. El aumento del uso de la telemedicina en el mundo ha sugerido el entendimiento de la cualidad de esos servicios. **Objetivo:** Traducir, adaptar culturalmente y validar un cuestionario para evaluación de la satisfacción de pacientes atendidos por telemedicina. **Métodos:** Se desarrolló una evaluación por un comité de jueces con la versión adaptada y después se llevó a cabo un pre-test con 30 pacientes atendidos en el proyecto *TeleOftalmo*. La prueba previa ocurrió para obtener una versión adecuada del instrumento. Además, se aplicó en una muestra de 141 pacientes atendidos vía telemedicina. Análisis de consistencia interna y de validación de constructo fueron realizadas. **Resultados:** El coeficiente de validez de contenido (CVC) Global de 0,942, demostrando claridad, pertinencia y relevancia de las cuestiones. El instrumento presentó consistencia interna con alfa de Cronbach estandarizado de 0,6; considerado aceptable. El análisis factorial exploratorio presentó un KMO de 0,56 la prueba de esfericidad de Bartlett presentó valor de 0,001. **Conclusiones:** El Cuestionario Brasileño de Evaluación de la Satisfacción de los Pacientes Atendidos por Telemedicina (QAS-Tele) es fácil y viable para evaluar la satisfacción de los pacientes atendidos por telemedicina.

Palabras-clave: Satisfacción del paciente. Telemedicina. Estudio de validación. Encuestas y cuestionarios.

INTRODUCTION

Telehealth is a way of providing health care using information and telecommunication technologies in a broad way. Telemedicine, in turn, is more specific and works to support remote diagnosis through remote medical reports and a qualified second opinion.[1] Telemedicine allows health professionals to work remotely, facilitating access to care for patients.[2,3] In times when social distancing is a recommendation, such as the SARS-CoV-2 pandemic, telemedicine proves to be an indispensable tool in the clinical response to COVID-19, and patient satisfaction makes all the difference in response and adherence to treatment.[4]

Consultations carried out by telemedicine tend to present clinical and patient satisfaction results similar to those of face-to-face consultations,[5,6] with the advantage of easy access.[3,4] In a study carried out with patients treated through telemedicine in the United States, 95% of the interviewees declared themselves very satisfied with the care received, demonstrating similar levels of satisfaction obtained for face-to-face care.[7,8]

Satisfaction assessment is a very important indicator in health, whether in face-to-face or telemedicine care. It is a complex concept, affected by many factors.[9] As for satisfaction, it is possible to evaluate the care provided by professionals, physical infrastructure, treatment received, equity in access to diagnosis, therapies and preventive measures, approach and decision in the procedures, affordable cost, adequate

information, in addition to the waiting time for care.[10] In telemedicine, other components can also be evaluated, such as the quality of the connection, the equipment used, and the communication between professionals and patients.[11] However, satisfaction assessments by telemedicine tend to be carried out by brief, quantitative, generic, non-standardized, and non-validated questionnaires for this context, hiding the dissatisfaction of patients who often cannot pinpoint the negative experiences with some telemedicine components, such as the form of interaction and difficulties with technology.[12-14]

For the evaluation of any outcome, including satisfaction, the validation of a questionnaire is an essential step for its use.[15] Regarding satisfaction with telemedicine, the instrument must take into account important aspects of this type of care, such as experience with the use of technology, convenience for patients (in terms of time and savings in commuting), relationship and ability to communicate between doctors and patients, so that it is adequate for the assessment of satisfaction.[15,16] In addition, statistical analyses that validate the reliability of the instrument should be considered, taking into account a broader assessment of telemedicine, with the inclusion of different modalities of care, instead of generic questions about satisfaction.[15]

Although there are studies related to patient satisfaction in telemedicine services in other countries,[3,15] there are still few studies that show the satisfaction results of patients treated by this technology in Brazil. In addition, consistent questionnaires in Portuguese to measure satisfaction with telemedicine care and indicate the quality of care and service provided were not found. Thus, the objective of this study was to translate, culturally adapt and validate the Questionnaire for the Assessment of Satisfaction of Patients Assisted via Telemedicine (QAS-Tele) to assess the satisfaction of patients treated by this type of care in Brazil.

METHODS

This is a methodological study of translation, adaptation, and validation of a questionnaire into Brazilian Portuguese. The validation process of the Brazilian Portuguese version of the QAS-Tele was preceded by a request for authorization to use the instrument from the main author. The original questionnaire, developed in the United States by Hanna et al.,[17] has 14 questions that address general satisfaction, patients' experience when using telemedicine, convenience for patients, doctor-patient relationship, and ability to communicate via telemedicine. The answers are scored on a 5-point Likert scale, where:

1 = "no, definitely not";
2 = "probably not";
3 = "maybe";
4 = "probably yes";
5 = "yes, definitely".

The final score of the instrument was calculated using the average of the scores. The result is evaluated by the numerical average of all items. This questionnaire was chosen to be adapted to Brazilian Portuguese since it is brief, easy to apply and was built, in its original version, taking into account the principles of reliability, validity, and generalization.[18] Furthermore, although the original questionnaire uses the word telehealth in some statements, in practice it was applied in a telemedicine service.

Translation and cultural adaptation were performed according to the standard methodology.[19] Direct translation into Portuguese was carried out by two independent bilingual translators (TM and RF). Then, there was a synthesis of the two translations, the translators discussed the differences and agreed on

a version. The back-translation carried out by two English-speaking natives with fluency in Portuguese (GF and SC) was followed by consolidation performed by a multidisciplinary expert committee that included a pedagogue (MP), a specialist in validation of health questionnaires (HM), and a nurse specialist in telemedicine (AM) care. Thus, a consolidated version was obtained, which was submitted to content validation with analysis of the content validity coefficient (CVC). This calculation took into account the analysis of four judges (AMM, FCC, HMM, MCM) regarding language clarity, pertinence, theoretical relevance, and theoretical dimension. Items for content validity were rated on a Likert scale from 1 to 5, in which:

    1 = very low;

    2 = low;

    3 = medium;

    4 = high; and

    5 = very high.[19]

For the validation process, patients over 18 years of age who used the Unified Health System (*Sistema Único de Saúde* – SUS) were included in the study, who agreed to participate in the research when they arrived for telediagnosis at TeleOftalmo.[20] TeleOftalmo is a project which implemented eight remote ophthalmological offices in health macro-regions of the state of Rio Grande do Sul to perform ophthalmological tests coordinated remotely by ophthalmologists and locally monitored by a previously trained nursing team. Patients are included on a platform by primary care and SUS physicians and then scheduled for care.[20] Patients with cognitive difficulties, measured by their difficulties in understanding where they were and for what reasons they were at the telediagnosis site, were excluded from the study along with those who did not go through the synchronous stage of care with the ophthalmologist.

The adapted version was used in the pre-test, applied to 30 patients treated at a remote point located in the metropolitan health macro-region. Most were females (57%), with a mean age of 49 years and incomplete elementary education (46%). These patients were not included in the next step of the questionnaire validation process.

Following the steps of the process, the semantic validation was carried out. The objective of this step was to verify the understanding of the items by the population for which the instrument is intended. In it, the questionnaire comprehension assessment was carried out, and the questions that were not understood by the patients underwent revision and modifications. To adjust the expression of the instrument, a group of consolidators was created, consisted of experienced telemedicine health professionals (TM, CP, and FC), who held meetings in which measures were discussed to facilitate the understanding of the questions by users. The selection criteria for these professionals were based on their experience with telemedicine, instrument validation, and application of instruments in the tested population. Table 1 presents the questionnaire with the original, translated, adapted, back-translated, and final versions.

The nursing team was trained to apply the instrument with lectures and discussion for the participating professionals. Joint training sessions were held in the application of the questionnaire, in which each interviewer trained with a colleague and the results were discussed later to evaluate the technique and correct possible collection errors. The sessions were as follows:

1. Interviewers were instructed to welcome users, explain the study, obtain their consent to participate by signing the Informed Consent, and explain any doubts;
2. Sociodemographic data, such as age, education and income, were collected;
3. Interviewers read each question of the adapted version of the instrument.

Table 1. Questionnaire to assess satisfaction with telemedicine in its original, translated, adapted, back-translated, and final versions. Porto Alegre, Brazil, 2020.

Original[17]	Translated version	Back-translated version	Translated and culturally adapted version	Final version (adjusted after pre-test)
Patient Satisfaction of a New Telemedicine Service for Pain Management	Satisfação do paciente em um novo serviço de telemedicina para tratamento da dor	*Patient Satisfaction of a new Telemedicine service for pain management*	Avaliação da Satisfação de Pacientes Atendidos via Telemedicina (QAS-Tele)	Avaliação da Satisfação de Pacientes Atendidos via Telemedicina (QAS-Tele)
1. *Appointments by video are better than I expected.*	A consulta através de vídeo é melhor do que eu esperava.	*Having a video appointment is better than I expected.*	O atendimento por vídeo é melhor do que eu esperava.	O atendimento por telemedicina é melhor do que eu esperava.
2. *I am satisfied with my Telehealth visit.*	Eu estou satisfeito com minha consulta por telemedicina.	*I am satisfied with telemedicine care.*	Eu estou satisfeito com meu atendimento por telemedicina.	Eu estou satisfeito com meu atendimento por telemedicina.
3. *I worried about my privacy.*	Eu me preocupei com minha privacidade.	*I was concerned about my privacy during a telemedicine appointment.*	Eu fiquei preocupado com minha privacidade durante o atendimento por telemedicina.	Eu fiquei preocupado com minha privacidade durante o atendimento por telemedicina.
4. *The care I received by Telehealth was just as good as with an in-person appointment.*	O cuidado que eu recebi por telemedicina foi tão bom quanto uma consulta presencial.	*A telemedicine appointment is as good as an in-person visit.*	O atendimento que eu recebi por telemedicina foi tão bom quanto um atendimento presencial.	O atendimento que eu recebi por telemedicina foi tão bom quanto um atendimento presencial.
5. *The Telehealth visit saved me travel time.*	A consulta por telemedicina salvou meu tempo de viagem.	*Telemedicine care has saved time I would spend traveling.*	O atendimento por telemedicina me fez economizar tempo com deslocamento.	O atendimento por telemedicina me fez economizar tempo com deslocamento.
6. *The Telehealth visit saved me money.*	A consulta por telemedicina economizou meu dinheiro.	*Telemedicine care has made me save money.*	O atendimento por telemedicina me fez economizar dinheiro.	O atendimento por telemedicina me fez economizar dinheiro.
7. *I was comfortable talking by video to the specialist.*	Eu estava confortável conversando com o especialista por vídeo.	*I was comfortable talking to a specialist via livestream video.*	Eu me senti confortável em conversar com o especialista por vídeo.	Eu me senti confortável em conversar com o médico por vídeo.
Responses: *1. No, definitely not* *2. I don't think so* *3. Maybe yes, maybe no* *4. Yes, I think so* *5. Yes, definitely*	1. Não, com certeza. 2. Eu acho que não. 3. Talvez. 4. Eu acho que sim. 5. Sim, com certeza.	*1. No, not at all.* *2. I don't think so.* *3. Maybe.* *4. I think so.* *5. Yes, for sure.*	1. Não, com certeza. 2. Eu acho que não. 3. Talvez. 4. Eu acho que sim. 5. Sim, com certeza.	1. Não, definitivamente não. 2. Provavelmente não. 3. Talvez. 4. Provavelmente sim. 5. Sim, com certeza.

Table 1. Continuation.

Original[17]	Translated version	Back-translated version	Translated and culturally adapted version	Final version (adjusted after pre-test)
8. I felt that everything was well covered during my visit.	Eu senti que tudo estava bem coberto durante a minha consulta.	*I believe the telemedicine examination was thorough.*	Eu senti que meu atendimento foi completo.	Eu senti que meu atendimento foi completo.
9. I would rather travel to have my next visit in-person than use Telehealth.	Eu prefiro viajar para ter minha próxima consulta pessoalmente ao invés de utilizar a telemedicina.	*I would rather travel for having an in-person appointment than using a telemedicine service.*	Eu prefiro viajar para ter meu próximo atendimento pessoalmente ao invés de utilizar a telemedicina.	Eu prefiro perder mais tempo com deslocamento para ter meu próximo atendimento pessoalmente ao invés de utilizar a telemedicina.
10. I had difficulty hearing or seeing the doctor through the video.	Eu tive dificuldade de ouvir ou de enxergar o médico através do vídeo.	*I had a difficult time hearing or seeing through video*	Eu tive dificuldade de ouvir ou de enxergar o médico através do vídeo.	Eu tive dificuldade de ouvir ou de enxergar o médico através do vídeo.
11. I was able to develop a friendly relationship with my doctor.	Eu fui capaz de desenvolver uma relação de confiança com o meu médico.	*I was able to build a trust relationship with a telemedicine physician.*	Eu fui capaz de desenvolver uma relação de confiança com o meu médico.	Eu fui capaz de desenvolver uma relação de confiança com o médico.
12. I was able to explain my problems clearly to my doctor during the Telehealth visit.	Eu fui capaz de explicar meus problemas com clareza ao meu médico durante a consulta por telemedicina.	*I was able to explain my problems in detail to a physician during a telemedicine appointment.*	Eu fui capaz de explicar meus problemas com clareza ao meu médico durante o atendimento por telemedicina.	Eu fui capaz de explicar meus problemas com clareza ao médico durante o atendimento por telemedicina.
13. The Telehealth visit was convenient.	A consulta por telemedicina foi conveniente.	*Telemedicine care was convenient.*	O atendimento por telemedicina foi conveniente.	O atendimento por telemedicina foi bom para mim.
14. I would recommend the Telehealth option to other patients.	Eu recomendaria a consulta por telemedicina para outros pacientes.	*I would recommend telemedicine services to other patients.*	Eu recomendaria o atendimento por telemedicina para outros pacientes.	Eu recomendaria o atendimento por telemedicina para outros pacientes.
Responses: *1. No, definitely not* *2. I don't think so* *3. Maybe yes, maybe no* *4. Yes, I think so* *5. Yes, definitely*	1. Não, com certeza. 2. Eu acho que não. 3. Talvez. 4. Eu acho que sim. 5. Sim, com certeza.	*1. No, not at all.* *2. I don't think so.* *3. Maybe.* *4. I think so.* *5. Yes, for sure.*	1. Não, com certeza. 2. Eu acho que não. 3. Talvez. 4. Eu acho que sim. 5. Sim, com certeza.	1. Não, definitivamente não. 2. Provavelmente não. 3. Talvez. 4. Provavelmente sim. 5. Sim, com certeza.

As for sample size, it was considered that for the validation process of the questionnaire, a sample of ten patients is recommended for each question to be validated.[19,21] The QAS-Tele is composed of 14 questions, 141 patients were interviewed, and the sampling was simple random.

Of the 163 subjects invited, 23 refused to participate due to lack of time to answer the questionnaire; thus, the final version was applied to 141 patients treated by the TeleOftalmo project. All patients seen during the period were invited to participate in the study, however this was a period with fewer patients scheduled and with high absenteeism due to the pandemic. The project, in 2020, served around 100 patients/month in the office where the questionnaire was applied. The responses obtained were recorded through the implemented questionnaire, with the following sections:

1. User acceptance and application of the Informed Consent;
2. Sociodemographic data — when asked about the participants' family income, the collectors explained the reference minimum wage;
3. Questions of the translated and adapted instrument.

Descriptive data analysis was performed to characterize the sample, and quantitative variables were described as mean and standard deviation, while categorical variables were presented as absolute and relative frequencies. The CVC was calculated considering the questions with an acceptable value of >0.80.[19] A Kappa test was performed to verify the agreement between the assessment of the four judges, and the following criteria were used:

<0 = disagreement;
0–0,20 = almost none;
0,20–0,40 = low;
0,40–0,60 = moderate;
0,60–0,80 = substantial;
0,80–1,00 = almost perfect.[19]

The Cronbach's alpha coefficient (internal consistency) was calculated as a measure of agreement between the means of the instrument's items. Cronbach's alpha values equal to or greater than 0.6 were considered as indicative of internal consistency in the questionnaire.[22]

Construct validity was performed by exploratory factor analysis (EFA). To verify the adequacy of the factor analysis, the Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) index and the Bartlett sphericity test ($p<0.05$) were used, which assess the presence of correlations between the variables. Data were collected in an electronic data sheet, imported for analysis into the Statistical Package for the Social Sciences (SPSS) Inc. Released 2009, Predictive Analytics Software (PASW) for Windows, version 21.0 (Chicago: SPSS Inc). The significance level adopted for statistical inference was 5.0%. The project was approved by the Ethics Committee of *Hospital Moinhos de Vento* (opinion number 3.466.154).

RESULTS

The analyses carried out contributed to the consolidation of the Brazilian Portuguese version of the QAS-Tele. In the stage of translation and cross-cultural adaptation, the analysis of the scores obtained from the evaluators (CVC) was 0.942 in the global assessment, all CVC values were greater than 0.8 in the analyses by question, demonstrating the clarity, pertinence, and relevance of the questions. Regarding the dimensions of general satisfaction, patient experience when using telemedicine, patient convenience, doctor-patient relationship, and ability to communicate via telemedicine, a percentage of agreement between the judges of 65% and a Kappa index of 0.57 were found and considered moderate (confidence interval — 95%CI 0.35–0.78).

The adapted version was applied in the pre-test in a sample of 30 users of the project and it was observed that patients had difficulty understanding questions 8, 9, and 13. These were changed to make them culturally easier for Brazilian Portuguese-speaking participants, as shown in Table 1.

The adapted version was applied to 141 patients treated at a remote ophthalmic diagnostic service. Among the interviewees, 95 (67%) were women, with a mean age of 53 years (SD±15); 50 (35.5%) had incomplete elementary education; 43 (30.5%) had a monthly income of one minimum wage; the average waiting time for remote diagnostic care was 224 days. Table 2 presents the main sociodemographic characteristics of the study participants.

Table 2. Sociodemographic characteristics of patients seen at the teleophthalmology service who answered the Questionnaire for the Satisfaction Assessment of Patients Seen via Telemedicine (n=141). Porto Alegre, Brazil, 2020.

Characteristics of patients	n	%
Gender		
Female	95	67.4
Male	46	32.6
Education		
Illiterate	7	4.9
Incomplete Elementary School	50	35.5
Complete Elementary School	29	20.6
Complete High School	47	33.3
Higher	8	5.7
Family income		
Less than 1 minimum wage (less than R$ 998.00)	16	11.3
From 1 (R$ 998.00) to two minimum wages (up to R$ 1,996.00)	86	61.0
≥3 minimum wages (≥R$ 2,994.00)	39	27.7
Self-reported race/color		
White	90	63.8
Black	25	17.7
Brown	21	14.9
Others	5	3.6
Age (mean; ±SD)	53.4	15.3
Total	**141**	**100**

SD: standard deviation.

The averages for the responses of the 141 patients treated via telemedicine for each of the instrument's questions are shown in Table 3. Questions 3, 9, and 10 are negative statements; thus, the answers were scored in an inverted arrangement, for analysis purposes only. The other questions are positive affirmations.

In the evaluation of internal consistency, the standardized Cronbach's alpha was 0.6, proving to be acceptable in this regard.[22,23] The standardized Cronbach's alpha was chosen because it adequately represents the homogeneity of the instrument's items.[24] Exploratory factor analysis presented KMO of 0.56; as it was considered an unacceptable value, confirmatory factor analysis was not carried out. On the other hand, Bartlett's sphericity test presented a value of 0.001, demonstrating that, based on this index,

Table 3. Response means of 141 patients treated via telemedicine for each of the questions in the satisfaction questionnaire being validated. Porto Alegre, Brazil, 2020.

Question	Mean	±SD
1. O atendimento por telemedicina é melhor do que eu esperava	4.88	0.36
2. Eu estou satisfeito com meu atendimento por telemedicina	4.90	0.32
3. Eu fiquei preocupado com minha privacidade durante o atendimento por telemedicina	4.87	0.51
4. O atendimento que eu recebi por telemedicina foi tão bom quanto um atendimento presencial	4.83	0.47
5. O atendimento por telemedicina me fez economizar tempo com deslocamento	3.84	1.60
6. O atendimento por telemedicina me fez economizar dinheiro	4.60	1.01
7. Eu me senti confortável em conversar com o médico por vídeo	4.89	0.54
8. Eu senti que meu atendimento foi completo	4.94	0.37
9. Eu prefiro perder mais tempo com deslocamento para ter meu próximo atendimento pessoalmente ao invés de utilizar a telemedicina	4.56	1.05
10. Eu tive dificuldade de ouvir ou de enxergar o médico através do vídeo	4.73	0.89
11. Eu fui capaz de desenvolver uma relação de confiança com o médico	4.80	0.57
12. Eu fui capaz de explicar meus problemas com clareza ao médico durante o atendimento por telemedicina	4.80	0.57
13. O atendimento por telemedicina foi bom para mim	4.97	0.14
14. Eu recomendaria o atendimento por telemedicina para outros pacientes	4.98	0.11

SD: standard deviation.

there was a possibility of factoring the instrument, which was not feasible due to the non-uniformity of measurements (KMO and Bartlett). therefore, by the one-dimensional model (1-factor).

DISCUSSION

The objective of this study was to translate, culturally adapt, and validate a questionnaire to assess the satisfaction of patients treated by telemedicine in Brazil. The assessment of conceptual equivalence and the QAS-Tele items showed that the instrument is feasible and easy to apply to be used in the assessment of the satisfaction of patients treated by telemedicine. In the original questionnaire in English, this validation had not been performed. Conceptual equivalence sought to explore the construct of interest (satisfaction) in its original definition and in Brazilian culture. The stages of translation and retranslation of the original version of the instrument were careful. Special attention was paid not to use expressions with regional influences or slang. Content validation was considered adequate as all the scores (CVC) found, both the global and individual ones for each question, were greater than 0.80.[19] Content validation is an essential step in this type of study, as it allows verifying whether the Questionnaire items adequately represent what needs to be measured — in this case, the theoretical relevance for assessing the satisfaction of patients treated by telemedicine.[26] The original study by Hanna et al.[17] did not perform this analysis, so it was not possible to perform a comparison of this phase between the original instrument and the one adapted for Portuguese.

Mair and Whitten,[27] in their study, reviewed research on patient satisfaction in telecare. In the studies found, the vast majority used simple survey instruments and the methodologies used to assess satisfaction were not clearly specified, which makes data comparison unfeasible. In addition, few of them defined what satisfaction meant and presented only initial impressions. The present work demonstrated

that the methodology is described in detail, and it is suggested that whenever the instrument is applied, its reliability assessment is carried out to determine how it behaved in the applied population. Also, applicators were instructed to explain the concept of satisfaction. Although the instrument does not have different dimensions, it includes the assessment of patient satisfaction beyond initial impressions. The questions address different aspects, such as the patients' experience with telemedicine, the convenience of care, privacy concerns, and whether they would recommend such care.

In the original study by Hanna et al.,[17] it is not clear how the questionnaire was answered by the participants, whether through a face-to-face interview or whether it was self-administered. The application of the instrument through face-to-face interviews was the most appropriate option in our environment, due to the characteristics of the population served, with visual difficulties and a lower level of education. The assessment of understanding in the pre-test study showed that the instrument was suitable to be applied by an interviewer, facilitating the understanding of the interviewees, especially since it is a sample of people with vision problems and low education.

In general, the average for the 14 questions of the questionnaire was high, indicating a good level of satisfaction. Other satisfaction assessments carried out in SUS health services that do not include telemedicine show that there is a positive evaluation of the public network in Brazil; however, linked to this, there are numerous difficulties pointed out by patients and related to care, to long waiting time, to queues, and to the lack of physical and material resources.[28] During the validation process, it was observed that some issues were not easy to understand for patients, probably because the instrument was applied in a project within the SUS network and due to sociodemographic conditions. Thus, questions 5 and 6 — "Telemedicine care saved me time on commuting" and "Telemedicine care saved me money" — left some patients confused. This is because patients always had to go to the place closest to their residence to perform the exams and these are free for SUS users. Therefore, depending on the reality in which the instrument will be applied, these are questions that must be explained in greater detail by the interviewer. This is an important point to consider when training professionals to apply the questionnaire.

The internal consistency analysis provided a standardized Cronbach's alpha value of 0.6 — an acceptable value, as indicated by Ursachi et al.[22] The alpha tends to be modified by the size of the instrument and is reduced in small tests.[22] In addition, it is an estimate, and it is indicated that every time the questionnaire is applied, a new alpha is calculated, since this measure may change.[22] Some tests to remove questions were carried out, however the attempts following established assumptions reduced the value of the alpha. Therefore, the best format of the questionnaire was the one that contemplated all the questions according to the original.

In the exploratory factorial evaluation process, the structure of 14 items was confirmed, without the indication of removal of questions or determination of different dimensions. This corroborates the assessment of moderate agreement between the judges, a fact that can be explained by the fact that some questions correspond to more than one of the dimensions, thus making it difficult to properly distribute the questions among the different dimensions suggested by the author of the original version. For example, "I felt comfortable talking to the doctor via video" could correspond to the "patient experience" dimension and also to "the ability to communicate via telemedicine". In testing the insertion of the dimensions suggested by the author of the original version of the instrument (general satisfaction, patient experience when using telemedicine, convenience for the patient, doctor-patient relationship, and ability to communicate via telemedicine), the non-uniformity of the KMO and Bartlett indices in the Portuguese language version were observed in the statistical analysis, thus opting for the instrument structure without dimensions.[24]

In the original version built by Hanna et al.[17], there was no factorial evaluation, although the author has suggested the use of dimensions and tested the questionnaire.

Some limitations should be highlighted in relation to this questionnaire and its application.

a) Many patients in this sample waited more than 220 days to receive specialized care, which may have modified the perception of satisfaction. Perhaps these patients felt grateful for the opportunity to see an ophthalmologist and were not able to truly assess the satisfaction items questioned.

b) All patients are SUS users, and comparisons with samples of private services could not be carried out, as in Brazil the telemedicine care model began during the COVID-19 pandemic and therefore there were no publications on this topic by the time this study was concluded.

c) Satisfaction is a complex issue affected by many factors,[9] so it would be important to apply the questionnaire in different scenarios in order to seek a better understanding of the components of satisfaction addressed in the instrument. In addition, the questionnaire was validated in the southern region of Brazil and may not represent all characteristics of the Brazilian population.

d) Although the instrument's internal consistency was acceptable, new results are expected to demonstrate very good internal consistency. In addition, the one-dimensional model option can be better explored.

It is important to emphasize the need for further studies to assess the validity and reliability of the QAS-Tele using representative samples from other telemedicine services. Especially at a time when the world has started to make greater use of telemedicine, a continuous process of instrument evaluation must be carried out to improve the construct validity of the questionnaire. Although the study instrument uses the concept of telemedicine, it is applicable to telehealth services as they provide for a greater number of initiatives.

The Brazilian version of the QAS-Tele can be made available for application in Brazilian telehealth services. It should be noted that the evaluation of the reliability of any instrument must always occur to verify how the instrument will behave in a given population. New studies may contribute to the evaluation of how the instrument behaves in different regions of the country and the confirmation of unidimensionality.

This work provides an easy and viable instrument to assess the satisfaction of patients treated by telemedicine, to be applied by an interviewer. Telemedicine in Brazil, during the pandemic, changed completely; thus, instruments to assess the satisfaction of patients and professionals involved in this model of care must be created and validated to assist in the qualification of the service provided, ensuring the optimization of access to the health network and the familiarization of patients with this new format of care.

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CONFLICT OF INTERESTS

Nothing to declare.

AUTHORS' CONTRIBUTIONS

TCM: Project Management, Formal Analysis, Conceptualization, Writing – Original Draft, Writing – Review and Editing, Methodology, Resources, Software, Supervision, Visualization. HMC: Formal Analysis, Methodology, Resources, Validation, Visualization. AGF: Data Curation, Writing – Original Draft, Research, Validation, Visualization. AMFM: Data Curation, Writing – Original Draft, Investigation, Validation, Visualization. GUB: Data Curation, Writing – Original Draft, Investigation, Validation, Visualization. LM: Data Curation, Writing – Original Draft, Investigation, Validation, Visualization. MSS: Data curation. RNU: Writing – Original Draft, Investigation, Validation, Visualization. ASR: Writing – Original Draft, Investigation, Validation, Visualization. FCC: Data Curation, Writing – Original Draft, Research, Obtaining Funding, Validation, Visualization. CGMP: Project Management, Formal Analysis, Conceptualization, Writing – Original Draft, Writing – Review and Editing, Methodology, Resources, Software, Supervision, Visualization.

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