

Quality of Care Scale instrument applied to Care Network users for the Person with Disabilities: a psychometric analysis

Instrumento *Quality of Care Scale* aplicado a usuários da Rede de Cuidados à Pessoa com Deficiência: uma análise psicométrica

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ABSTRACT

Purpose: To analyze the psychometric properties of the Quality of Care Scale instrument applied to Care Network users for the Person with Disabilities. **Methods:** This is an observational, analytical, and cross-sectional study. Interviews with 869 users of the specialized Care Network for the Person with Disabilities component were conducted through instruments of sociodemographic characterization, socioeconomic classification, and self-reported Quality of Care. The Quality of Care Scale research instrument contains 19 questions distributed between the professional and care, access, social needs, and information received axes. It was validated in Brazil in 2014 with a sample composed of people with intellectual and physical disabilities. In this study, the questions were led by researchers to people with intellectual, physical, hearing, visual, or multiple disabilities. For psychometric analysis, we used the item of Response Theory, and factorial analysis and measures of convergent validity and reliability. **Results:** All items were relevant and with acceptable discrimination for the formation of the first order (Quality of Care axes) and second-order (Quality of Care indicator) constructs, except one information received the item, which was removed from the final model for having presented low factorial load. The constructs presented the required levels of reliability, convergent validation, and proper fit. **Conclusion:** The psychometric analysis of the Quality of Care Scale instrument revealed that the final model presented in this paper can be expanded to measure the Quality of Care offered to people with intellectual, hearing, physical, visual, or multiple disabilities, users of Care Network for the Person with Disabilities.

Keywords: Disabled persons; Quality of health care; Health evaluation; Validation studies; Scales

RESUMO

Objetivo: Analisar as propriedades psicométricas do instrumento *Quality of Care Scale*, aplicado a usuários da Rede de Cuidados à Pessoa com Deficiência. **Métodos:** Trata-se de estudo observacional, analítico e transversal. Entrevistas com 869 usuários do componente especializado da Rede de Cuidados à Pessoa com Deficiência foram realizadas por meio de instrumentos de caracterização sociodemográfica, classificação socioeconômica e Qualidade do Cuidado autorreferida. O instrumento para investigação da Qualidade do Cuidado, *Quality of Care Scale*, contém 19 perguntas distribuídas entre os seguintes eixos: profissionais e atendimento, acesso, necessidades sociais e informações recebidas. Foi validado no Brasil em 2014, com amostra composta por pessoas com deficiência intelectual e física. Neste estudo, as perguntas foram conduzidas pelos pesquisadores a pessoas com deficiência intelectual, física, auditiva, visual ou múltipla. Para a análise psicométrica, foram utilizadas a Teoria de Resposta ao Item e a análise fatorial, além das medidas de validade convergente e confiabilidade. **Resultados:** Todos os itens foram relevantes e com discriminação aceitável para formação dos constructos de primeira ordem (eixos da Qualidade do Cuidado) e segunda ordem (indicador Qualidade do Cuidado), exceto um item de informações recebidas, que foi retirado do modelo final, por ter apresentado carga fatorial baixa. Os constructos apresentaram níveis exigidos de confiabilidade, validação convergente e ajuste adequados. **Conclusão:** A análise psicométrica do instrumento *Quality of Care Scale* revelou que o modelo final apresentado neste trabalho pode ser ampliado para medir a Qualidade do Cuidado ofertada a pessoas com deficiência intelectual, auditiva, física, visual ou múltipla, usuários da Rede de Cuidados à Pessoa com Deficiência.

Palavras-chave: Pessoas com deficiência; Qualidade dos cuidados de saúde; Avaliação em saúde; Estudos de validação; Escalas

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INTRODUCTION

According to the World Report on Disability, there are about one billion people with disabilities in the world, but information on the quality of services offered to this expressive population is scarce⁽¹⁾. Thus, research into access and how people with disabilities have received the assistance they need is becoming increasingly necessary.

The evaluation of health services should highlight the impacts of the activities carried out, clarifying the service and facilitating decision making by correcting failures and changing behaviors. However, it is interesting to obtain information also from the users since the Quality of Care can be better understood when considering the experiences and meanings of the actors involved⁽²⁻⁴⁾. Thus, the instrument used should follow the measure proposed to evaluate, and, in the case of the Quality of Care self-reported by the user, it should objectively evaluate subjective responses. Few studies have proposed to develop instruments to measure the Quality of Care⁽⁵⁻⁹⁾.

The project *Quality of Care and Quality of Life for People with Intellectual and Physical Disabilities: Integrated Living, Social Inclusion and Service User Participation* (DISQOL), created in 2005 by the World Health Organization (WHO), brought together Brazil and 15 other international centers to develop instruments and investigate three elements of impact on the lives of people with intellectual and physical disabilities: quality of life, quality of available care and attitude of family members in face of disabilities⁽⁵⁾. The instrument *Quality of Care Scale*⁽⁶⁾, from the DISQOL project, was validated in Brazil and used in this study, aimed at verifying whether it is possible to measure the Quality of Care for people of all types of disabilities, expanding the initial proposal.

Thus, psychometry is a way to verify the validity and reliability of the evaluation of mathematical characteristics in empirical data. The psychometric analysis observes the quality of the questions and their distribution in an instrument (validity), contributing to obtain consistent and reproducible data (reliability)^(10,11). Also, in the case of instruments that have already been validated such as the Quality of Care Scale, a new psychometric analysis becomes important when the population of the new study is different from the original study because reliability is not a fixed measure property, i.e., it can vary in different contexts⁽¹¹⁾. The new psychometric analysis can then expand the application possibilities of the instrument.

Thus, this study aimed to analyze the psychometric properties of the instrument *Quality of Care Scale*⁽⁶⁾ applied to the Care Network users for People with Disabilities.

METHODS

This is an observational, analytical, and cross-sectional study, carried out with a per cluster sample, with 869 users of the specialized component of the Care Network for People with Disabilities in Minas Gerais (RCPD-MG). The sample calculation used the method for estimation of proportions for finite populations⁽¹²⁾, in three stages: proportional allocation of the sample to the 13 expanded health regions of Minas Gerais, health region and type of service (intellectual, hearing, physical, visual and ostomy). We considered 95% confidence level, 5% margin of error, and 23.9% disability prevalence, according

to data from the 2010 Census. We estimated a sample of 385, considering the margin of error adopted.

The Health Care Networks (RAS) constitute a set of services to a population that act in a cooperative and interdependent way, through its components⁽¹³⁾. In the case of RCPD-MG, the Primary Health Care (APS) coordinated health care and the Specialized Outpatient Care (AAE) offered rehabilitation services⁽¹³⁾. The specialized component of RCPD-MG includes Specialized Center for Rehabilitation (CER), Specialized Service for Intellectual Rehabilitation (SERDI), Hearing Health Care Service (SASA), Physical Rehabilitation Service (SRF), Ostomy Care Service (SASPO) and Visual Rehabilitation Service (SRV).

The inclusion criteria should have users linked to the service for at least six months with at least two appointments during this period.

Among the instruments used, the researchers developed the User Interview Guide and addressed sociodemographic aspects (gender, age, education, race, marital status, work, and income) and type of disability. The Brazil Economic Classification Criterion⁽¹⁴⁾ (CCEB) assessed the economic classification, distributed between classes AB (A, B1, B2), C (C1 and C2), and DE.

The instrument *Quality of Care Scale*⁽⁶⁾ assessed the self-reported Quality of Care through 19 questions, distributed into four constructs: professionals and care, access, social needs, and information received (Chart 1).

In the original study⁽⁶⁾, in its self-administered format, the questionnaire was answered by people with intellectual and physical disabilities, with the following options: none, medium, or totally. The answers had a score on a Likert scale of 1, 3, or 5, respectively, and in the end, the points were added in gross value and converted into a scale from 0 (zero) to 100.

In this study, the researchers asked the questions to people with intellectual, physical, hearing, visual, or multiple disabilities, who chose one of three answers: no, partially, or yes. This adaptation occurred due to the change of the self-applied format for the interview. The companions (guardian, relative, caregiver, or friend) of users with intellectual or hearing disabilities and users under 18 years old also participated in the interview, confirming or providing answers. Later, as in the original study⁽⁶⁾, we used a score of 1 (no), 3 (partially) or 5 (yes) to sum up the gross value attributed to the answers and scale conversion from 0 (zero) to 100.

For most questions in the instrument, the answers “no” or “yes” indicated a negative or positive evaluation regarding the Quality of Care, respectively. However, in some questions of the construct access, this relationship is the opposite, i.e., the answer “no” is positive, and the answer “yes” is negative. Thus, the first four items of this construct were inverted in the analysis, so that everyone was in the same direction. In the description and comparison between the items of each construct, intervals less than 50 showed disagreement regarding the item, i.e., they indicated the respondents’ negative answer about the Quality of Care. Intervals greater than 50 showed agreement, indicating a positive answer, and values equal to 50 showed partiality answers.

The data were obtained between April and September 2016, through individual interviews in the waiting rooms of 36 services of the specialized component of RCPD-MG, distributed in the 13 expanded health regions. We chose interviews favoring the meeting of the researchers with the users. The answers and the questionnaires were recorded in

Chart 1. Description of the *Quality of Care Scale* instrument items

Construct	Item	Legend
Professionals and Service	PS1	Are the people who serve you good at their job?
	PS2	Do the people who serve you (user) know enough about your condition or disability?
	PS3	Do the people who serve you (user) meet your needs?
	PS4	Do the people who serve you (user) include you in decisions regarding your health and/or social care?
Access	ACE1i	Do you have to wait a long time to see the people who serve you?
	ACE2i	Do you have to fill out a lot of paperwork (a lot of bureaucracy) to receive the services you need?
	ACE3i	Do you need to fight to obtain the service and support you need?
	ACCE4	Does the lack of service at your place of residence limit the care and support you receive?
	ACCE5	Is it easy to schedule healthcare appointments?
	ACCE6	Is it easy to schedule non-healthcare appointments?
Social Needs	SN1	Do you have the help you need to live at your home?
	SN2	Can you get help to participate in leisure activities?
	SN3	Can you get help to participate in social activities?
	SN4	Do you receive enough care/service and support?
	SN5	Does the care/service you receive make you feel secure?
Received Information	RI1	Did you receive enough information about your disability? (disability/limitation)?
	RI2	Do you know the services and support you can find to help you?
	RI3	Do you know about the money and other benefits you can receive as aid?
	RI4	Is the information you receive easy to understand?

audio and, later, categorized and checked in a database, using the Excel program (version 2016).

In the descriptive analysis, we used absolute and relative frequencies for categorical variables, in addition to measures of position, central tendency, and dispersion for numerical variables.

The Quality of Care indicator was created with no direct formation by items (questions), but by latent variables (indicators). The *Two-Step* approach addressed this characteristic of the measurement structure⁽¹⁵⁾. Thus, the scores of the first-order latent variables (professionals and care, access, social needs, and information received) were computed through factorial analysis, together with the Item Response Theory (IRT)⁽¹⁶⁾.

The IRT consists of a set of mathematical models that relate to a latent trait, that is, a variable that cannot be observed directly, but that can be inferred through the analysis of variables related to it^(10,16). In this step, we used the logistic model with two parameters: difficulty (β) and discrimination (α). The difficulty parameter indicated how “difficult” a given question was, i.e., the higher the difficulty parameter, the greater the individual’s ability to have a positive answer^(10,16). The discrimination parameter characterized the item’s ability to differentiate individuals with different levels of agreement, that is, it indicated the individual quality of each item in the measurement of the latent trait, with a value greater than or equal to 0.65 considered in the analysis^(10,16). For the model adjustment to be possible, the scale of the items of the constructs was transformed into binary. Therefore, exclusively for the IRT analysis, the answers “partially” and “yes” were transformed into a single class.

After this process, we used the factorial analysis, with the three categories of answers, to create the general indicator (Quality of Care). The main factorial analysis function⁽¹⁷⁾ is to reduce many variables to a reduced number of factors. The factor load (FL) corresponds to the correlation between the original variables and the factors (latent variables). FL values below 0.50 are used as a criterion to eliminate variables that are not contributing to the measurement of the construct⁽¹⁷⁾.

The quality of the general indicator (Quality of Care) was assessed through the analysis of the convergent validity and reliability of each construct. For convergent validity, we used the criterion of the average variance extracted (AVE) (average percentage of variance shared between the latent construct and its items) above 50%⁽¹⁷⁾. For reliability analysis, we considered values greater than 0.60 for the Cronbach’s alpha (CA) coefficient (proportion of the total variance of the scale that is attributed to the true latent construct score)⁽¹⁷⁾ and composite reliability (CR) (the degree to which a set of items in a construct is internally consistent in its measurements)⁽¹⁷⁾. To prove the adequacy of the factorial analysis model, we considered a Kayser-Meyer-Olkin coefficient (KMO) value greater than or equal to 0.50 (proportion of the data variance that can be considered common to all variables)⁽¹⁷⁾.

Data processing and analysis were performed using the R software (version 3.4.4). Based on the initial model, the final model was formed by the items that presented the parameters previously described.

The Research Ethics Committee of the Universidade Federal de Minas Gerais approved this study, under opinion ETIC 913612. All participants aged 18 or over signed the Informed Consent Form (IC) and those aged 7 to 17 years, signed the Assent Form.

RESULTS

More than half of the users participating in the study were male (56%), only 10% had at least completed high school, more than half declared to be brown or black (55%) and most of them were single (70%). The average age of users was 29 years old (SD = 28), with half of them up to 14 years old. The minimum and maximum ages were 1 month and 97 years old.

Only 6% of users worked, with the most frequent reason being underage (59%). Most users were of economic classification C (58%), with 33% having no personal income and 58% even

having a minimum salary of informed personal income. Most of them had informed household income less than or equal to two minimum wages (71%).

As for the types of disabilities, 31% had intellectual, 26% physical, 22% multiple (two or more types of disabilities), 19% hearing, and 2% visual disabilities. In 35% of the cases, there was another associated comorbidity.

Regarding the description of the items of each first-order construct, there was disagreement regarding item AC4i “Does the lack of services where you live limit the service and support you receive?”, as the interviewees tended to answer “yes”. There was partiality regarding item IR3 “Do you know about money and other benefits that you can receive as aid?”, in which the interviewees tended to answer “partially” (Table 1).

Regarding the factorial analysis of the first-order constructs, despite the item NS1 “Do you have the help you need to live in your home?” having presented a factorial load less than 0.50, was maintained because it did not impede the validation of the construct. The item IR3, “Do you know about the money and other benefits that you can receive as aid?” was removed from the analysis because it had a very low factor load (FL=0.36). Also, items NS4 “Do you receive sufficient care/service and support?” ($\alpha=0,50$) and NS5 “Does the care/service you receive make you feel secure?” ($\alpha=0,42$), presented low discrimination. Analyzing the final model, all items were relevant to the formation of the latent variable (FL> 0.50), in addition to presenting acceptable discrimination ($\alpha > 0.65$) (Table 2).

In the factorial analysis for the second-order construct, Quality of Care, all items had a factor load greater than 0.50, except for the social needs indicator (FL=0.49), which, however, was maintained because it was close to 0,50 and did not impair the validation of the construct (Table 3).

In the validity and quality verification measures, all constructs, both first-order and second-order, had required levels of reliability (CA or CR > 0.60), convergent validation (AVE > 0.40), and adequate adjustment (KMO > 0.50) (Table 4).

DISCUSSION

Public policies related to people with disabilities have been expanded in Brazil in recent years; however, this population still faces numerous barriers, including architectural, attitudinal, and organizational barriers, including in the health area⁽¹⁸⁾. With a growing demand from society regarding the quality of public services provided, studies have investigated the Quality of Care from the perspective of the user⁽¹⁹⁻²⁴⁾, but few have specifically addressed services for people with disabilities. Thus, the recent implementation of the scenario of this study, the RCPD-MG, requires evaluations that can reveal how the services are being provided and indicate the necessary adjustments.

As in the original study, the items of professionals and service, and access proved to be important for the formation of their respective constructs and the latent variable. The way the team conducts care has been identified as fundamental to the Quality of Care⁽²⁵⁾ and, also, the difficulties in the access raise relevant social issues in health care in Brazil, mainly in the case of people with disabilities, emphasizing the inequalities to which they are exposed^(18,26). For such reasons, relevant data on the Quality of Care may emerge from these constructs, indicating possibilities for improving care and access to health for people with disabilities.

In the social needs construct, item NS1 (Do you have the help you need to live in your home?) was maintained, despite the low factor load, and items NS4 (Do you receive sufficient care/service and support?) and NS5 (Does the care/service you receive make you feel safe?) presented low discrimination, that is, low quality to measure this trait. This construct also had a low factor load to form the latent variable. As the values were close to the stipulated ones, the maintenance of these items did not compromise the formation of the final model of the instrument; however, we emphasize the need for further investigations in future studies. This measure reinforces the Quality of Care to favor the integration of people with disabilities in society, which promotes quality of life, development of citizenship, and appropriation of physical and mental space⁽²⁷⁾.

Table 1. Description and comparison of the constructs' items (n=869)

Construct	Item	Average	SD	CI 95%
Professional and Service	PS1	92.23	20.79	[90.91; 93.56]
	PS2	82.91	34.59	[80.38; 85.33]
	PS3	86.65	29.59	[84.70; 88.49]
	PS4	79.46	39.08	[76.99; 82.16]
Access	ACCE1i	72.67	41.55	[69.91; 75.38]
	ACE2i	83.95	35.00	[81.70; 86.13]
	ACCE3i	70.25	42.91	[67.43; 72.96]
	ACCE4i	44.99	48.78	[41.71; 48.16]
	ACCE5	53.74	45.29	[50.86; 56.62]
	ACCE6	64.27	44.75	[61.10; 67.09]
Social Needs	SN1	85.73	33.91	[83.54; 87.98]
	SN2	72.90	43.52	[69.73; 75.95]
	SN3	73.88	42.83	[71.06; 76.76]
	SN4	74.34	41.12	[71.75; 76.93]
	SN5	75.20	41.54	[72.56; 77.68]
Received Information	RI1	76.18	41.11	[73.36; 79.00]
	RI2	64.56	45.71	[61.45; 67.66]
	RI3	51.38	47.74	[48.16; 54.66]
	RI4	81.88	34.15	[79.69; 83.89]

Subtitle: n = Number of Subjects; SD = Standard Deviation; CI = Confidence Interval

Table 2. Factor analysis and logistic model of two parameters of the Item Response Theory for first-order constructs

Construct	Item	Initial Model				Final Model			
		Factorial analysis		IRT		Factorial analysis		IRT	
		FL	Com	α	β	FC	Com	α	β
Professionals and Service	PS1	0.80	0.63	1.98	-2.79	0.80	0.63	1.98	-2.79
	PS2	0.63	0.40	1.40	-1.82	0.63	0.40	1.40	-1.82
	PS3	0.89	0.80	5.11	-1.51	0.90	0.81	5.11	-1.51
	PS4	0.53	0.28	0.79	-2.12	0.52	0.27	0.79	-2.12
Access	ACE1i	0.72	0.51	1.63	-1.12	0.72	0.52	1.63	-1.12
	ACE2i	0.59	0.35	1.91	-1.49	0.59	0.35	1.91	-1.49
	ACE3i	0.76	0.58	2.28	-0.86	0.76	0.58	2.28	-0.86
	ACCE4i	0.62	0.39	1.31	0.12	0.63	0.39	1.31	0.12
	ACCE5	0.63	0.39	1.51	-0.48	0.63	0.39	1.51	-0.48
	ACCE6	0.59	0.35	1.05	-0.99	0.58	0.34	1.05	-0.99
Social Needs	SN1	0.48	0.23	1.34	-1.86	0.47	0.22	1.34	-1.86
	SN2	0.81	0.66	3.28	-0.75	0.81	0.66	3.28	-0.75
	SN3	0.85	0.72	6.76	-0.73	0.85	0.71	6.76	-0.73
	SN4	0.77	0.60	0.50	-2.74	0.78	0.61	0.50	-2.74
	SN5	0.52	0.27	0.42	-3.14	0.52	0.27	0.42	-3.14
Received Information	RI1	0.63	0.40	1.35	-1.28	0.61	0.38	1.90	-1.08
	RI2	0.69	0.47	1.59	-0.71	0.65	0.42	1.08	-0.89
	RI3	0.36	0.13	0.93	-0.30	-	-	-	-
	RI4	0.64	0.40	1.21	-2.07	0.63	0.40	1.35	-1.94

Subtitle: IRT = Item Response Theory; FL = Factor Load; Com = Communality; α = Discrimination; β = Difficulty

Table 3. Factorial analysis for the second-order construct (Quality of Care)

Construct	Item	FL	Com	Weight
Care quality	Professional and Service	0.73	0.53	0.40
	Access	0.74	0.55	0.40
	Social Needs	0.49	0.24	0.27
	Received Information	0.71	0.51	0.39

Subtitle: FL = Factorial Load; Com = Communality

Table 4. Validation of the first and second-order constructs

Constructs	Items	Dim	% 1° factor	CA	CR	AVE	KMO
First-order							
Professionals and Service	4	1	46.52%	0.59	0.81	0.49	0.69
Access	6	1	39.11%	0.69	0.82	0.40	0.76
Social Needs	5	1	41.04%	0.60	0.82	0.40	0.61
Received Information	3	1	51.63%	0.50	0.67	0.50	0.60
Second-order							
Care quality	4	1	46.1%	0.58	0.70	0.46	0.68

Subtitle: Dim = Dimensionality; CA = Cronbach's alpha; CR = Composite Reliability; AVE = Average Variance Extracted; KMO = Kaiser-Meyer-Olkin

In information received, item IR3 (Do you know about the money and other benefits that you can receive as aid?) was removed from the final model because it had a very low factor load. When asked about knowledge of available financial aid, most participants answering “partially” commented that, despite knowing, the information was not easily accessible, and obtaining and maintaining benefits are difficult processes. They also commented that, despite their knowledge, they were unable to obtain aid. Studies have confirmed the complexity of accessing the Continued Benefit (BPC) of the Organic Social Assistance Law (LOAS) and pointed out that the eligibility process for the benefit needs to be revised to avoid retractions to social rights⁽²⁸⁻³⁰⁾. The influence of the degree of satisfaction for the access to financial aid can, therefore, explain the very

low factor load of the item, evoking dissatisfaction instead of knowledge about the topic.

It is important to highlight the differences between the original study⁽⁶⁾ and the present study. In the first one, the sample was given by convenience, as the study was linked to other international centers coordinated by the World Health Organization (WHO), which determined a minimum number for the sample in each country. Also, the age group was 18 to 65 years old, and the subjects had intellectual and physical disabilities. Participants attended, for at least two years, various health services and schools in the city of Porto Alegre and its metropolitan region. The participants read the questions and scored the answers. In this research, the sample was probabilistic by a conglomerate, composed of users of a

thematic network, on a state scale. Users of all age groups and all types of disabilities participated. To make this possible, the instrument was adapted from its self-applied format for an interview and part of the users' companions confirmed or provided answers.

The application of the instrument in a population different from its original study can be assessed, at first, as a limitation. However, its use in another context, with state coverage and in an implanting network, is unprecedented and can contribute as an advance. In this scenario, the participation of the companions can be understood by considering that they experience, with the users, the service routine. However, future studies must investigate instruments that can directly include people with disabilities of different types and degrees.

We verified satisfactory levels of validity and reliability in the final model of the instrument applied to the sample studied, expanded in terms of types of deficiency, about the original study, which addressed users with physical and intellectual disabilities, allowing the use of the instrument in the investigation of the Quality of Care for people of all types of disabilities in the RCPD-MG.

CONCLUSION

The analysis of the psychometric properties of the final model of the Quality of Care Scale instrument presented in this study proved to be adequate for the sample, expanding the possibility of application for investigating the Quality of Care for people with intellectual, hearing, physical, visual or multiple disabilities, as users of the Care Network for People with Disabilities.

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