

## QUALITY OF NEUROPEDIATRIC PHYSIOTHERAPY SERVICES: VALIDATION OF INSTRUMENT BASED ON CAREGIVERS' PERCEPTION

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**ABSTRACT:** The elaboration of instruments requires the selection of suitable methods that guarantee consistency and validity. Thus, the objective of this study was to develop an instrument to assess the quality of neuropsychiatric physiotherapy services, based on the perception of caregivers. The following steps were performed: theoretical definition and selection of dimensions and items; determination of the sampling process; and evaluation of psychometric properties, analysis of reliability and validity, by Exploratory (EFA) and Confirmatory (CFA) Factor Analysis. The Kaiser-Meyer-Olkin test had an index of 0.917 and Bartlett's sphericity was  $\chi^2 = 4540.178$  ( $p < 0.001$ ). It obtained an internal consistency greater than 0.70 for each of the four factors used by EFA. A selected structure was confirmed by the CFA, indicating a good model fitting ( $\chi^2/\text{gl} = 1.534$ ; RMSEA = 0.046; TLI = 0.927; CFI = 0.936). An instrument was constructed to assess the quality of neuropsychiatric physiotherapy services, whose psychometric properties demonstrated evidence of validity and reliability.

**KEY WORDS:** Health services research; Physical therapy specialty; Quality of health care; Surveys and questionnaires; Validation study.

## QUALIDADE DE SERVIÇOS DE FISIOTERAPIA NEUROPEDIÁTRICA: VALIDAÇÃO DE INSTRUMENTO BASEADO NA PERCEPÇÃO DE CUIDADORES

**RESUMO:** A elaboração de instrumentos requer a seleção de métodos adequados que garantam consistência e validade. Assim, o objetivo deste trabalho foi desenvolver um instrumento para avaliar a qualidade de serviços de Fisioterapia neuropsiquiátrica, com base na percepção de cuidadores. Foram realizadas as etapas de definição conceitual e seleção de dimensões e itens; determinação do processo de amostragem; e avaliação das propriedades psicométricas, mediante análise da fidedignidade e da validade, pela Análise Fatorial Exploratória (AFE) e Confirmatória (AFC). O teste de Kaiser-Meyer-Olkin obteve um índice de 0,917 e o de esfericidade de Bartlett de  $\chi^2 = 4540,178$  ( $p < 0,001$ ). Obteve-se uma consistência interna superior a 0,70 para cada um dos quatro fatores definidos pela AFE. A estrutura obtida foi confirmada pela AFC, indicando um bom ajuste de modelo ( $\chi^2/\text{gl} = 1,534$ ; RMSEA = 0,046; TLI = 0,927; CFI = 0,936). Construiu-se, desse modo, um instrumento para avaliar a qualidade de serviços de Fisioterapia neuropsiquiátrica, cujas propriedades psicométricas demonstraram evidências de validade e fidedignidade.

**PALAVRAS-CHAVE:** Avaliação dos serviços; Estudos de validação; Fisioterapia; Qualidade da assistência à saúde; Questionários.

## INTRODUCTION

The development of instruments is a complex process<sup>1</sup> that involves resources and knowledge from different areas<sup>1,2</sup>. The validation process also requires care, including adapting to one population, and its generalization to other populations is not allowed<sup>3</sup>. Before elaborating an evaluation instrument, it is necessary to determine what is intended to be measured<sup>4</sup> and to choose the appropriate methods that guarantee the consistency and validity of the items built in order to measure what is proposed<sup>1</sup>.

In this sense, although the process of evaluating the quality of healthcare services has intensified with the reorganization of the health care network in Brazil<sup>5</sup>, there was a scarcity of validated instruments focused on assessing the quality of specific services for Neuropsychiatric physiotherapy<sup>6</sup>.

An instrument that has already been validated and widely used to assess children's services based on the perception of parents or caregivers is the *Measure of Processes of care* (MPOC-20), which is a reduced version of the *MPOC-56*<sup>7,8</sup> instrument, whose measures are available in different languages and have been validated for use in several countries<sup>9</sup>. However, despite involving aspects of the quality of pediatric rehabilitation centers, they are not specific to Physiotherapy services.

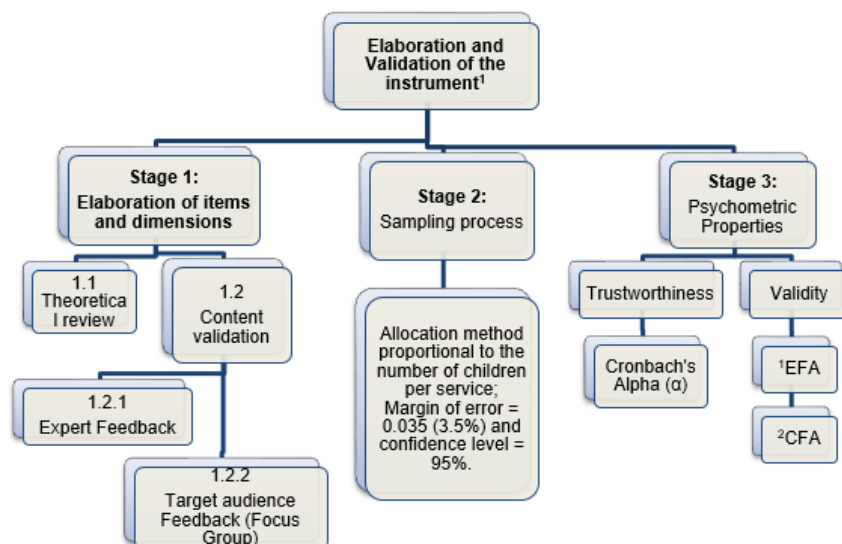
The evaluation of the quality of services can be determined by a set of criteria that favor the best possible result in the care process, considering technical,

interpersonal and organizational attributes<sup>10,11</sup>. In this perspective, in a literature review study<sup>6</sup>, the relevance of some aspects related to the quality of Physiotherapy services was verified, such as the therapist-patient relationship, the process to get a place in the service, the waiting time to be assisted and those related to the organization and cleaning of the service.

The initiative of this study, therefore, both with regard to the assessment of Physiotherapy services and in the process of validating instruments, may represent future gains in terms of qualified assistance guarantees<sup>11</sup> for children who access physiotherapeutic treatment and increased knowledge in these fields. Investigating the quality of services is important for monitoring actions, in order to guarantee the quality of care provided to users<sup>12</sup>. Thus, the present study aims to develop an instrument to assess the quality of neuropsychiatric physiotherapy services, based on the perception of caregivers of children undergoing rehabilitation.

## METHODOLOGY

This is a methodological study for the construction and validation of an instrument for evaluating the quality of neuropsychiatric physiotherapy services, whose development process followed the steps proposed by Carpenter<sup>1</sup>, distributed in: (i) conceptual definition and selection of dimensions and items, (ii) determination of the sampling process and (iii) evaluation of psychometric properties (Figure 1).



**Figure 1.** Summary of the methodological stages carried out in this study.

<sup>1</sup> Exploratory Factor Analysis; <sup>2</sup> Confirmatory Factor Analysis.

- (i) Conceptual definition and selection of instrument items

## THEORETICAL REVIEW

A literature review<sup>6</sup> was carried out to assist in the preparation of the instrument items. The elements raised in the review were organized according to the operational components of quality in health services proposed by Donabedian<sup>10</sup>: structure, processes and results. Based on these components, Brousselle et al.<sup>11</sup> proposed to classify the instrument in three dimensions of quality, namely: organizational (D1), interpersonal (D2) and technical (D3), thus, the instrument proposed in this study originated. It was appointed as an instrument for the Evaluation of the Quality of Neuropediatric Physiotherapy Services (AQSF-Neuroped). In the AQSF-Neuroped each item is evaluated on a Likert scale from 1 to 5 points, according to the perception of quality regarding the aspects (1- very bad; 2- poor; 3- regular; 4- good; 5- very good). The initial version had 55 items, distributed in three dimensions: D1 (13), D2 (20) and D3 (22).

## Content validation

### *Expert feedback*

The first version of the instrument and specific instructions for the procedure were sent electronically<sup>13</sup> to five judges<sup>14,15</sup>, selected for their expertise in the area of health services evaluation, or for their experience in clinical practice in neuropediatric services and / or their methodological knowledge about the elaboration / validation of questionnaires. It was requested to evaluate the wording of the items and the structure of the instrument based on the following criteria: representativeness, clarity and relevance<sup>2</sup>. The judges indicated their degree of agreement (total, partial or non-agreement), as well as suggestions for adding or excluding items.

### *Target audience feedback*

After the experts' evaluation, the instrument was evaluated by means of a focus group (FG)<sup>16</sup>, with six

mothers of children undergoing neuropediatric rehabilitation. The selection of caregivers obeyed the following criteria, in order to homogenize the sample<sup>16</sup>: being the child's mother, having been accompanying him/her in the Neuropediatric Physiotherapy service for at least a month and being able to read and write.

The moderation of FG<sup>16</sup> followed a sequence: presentation of the theme; presentation dynamics among mothers; discussion about the quality of neuropediatric physiotherapy services; and exposure and discussion of the dimensions and items of the instrument, following the same criteria analyzed by the specialists.

- (ii) Sampling and data collection process

The target population was represented by guardians or caregivers of children who were undergoing rehabilitation in five neuropediatric physiotherapy services in the city of João Pessoa-PB (N = 491). From the proportional allocation method, a sample was calculated with a margin of error of 0.035 (3.5%) and a confidence level of 95%, totaling 265 respondents.

The study is part of a larger project entitled "Microcefalia Associada ao Zika Vírus no Estado da Paraíba: Repercussão e Condições de Acesso" and was approved by the Research Ethics Committee of the Federal University of Paraíba (CAAE 64800416.9.1001.5188). Data were collected between September and November 2017, in accordance with the guidelines of Resolution No. 466/12 of the National Health Council. All participants formally agreed to participate in the study by signing the Free and Informed Consent Form.

- (iii) Assessment of psychometric properties

The validation process of the instrument items occurred through the analysis of reliability and validity<sup>14</sup>. The first was measured by internal consistency, using Cronbach's alpha coefficient ( $\alpha$ ), with values above 0.70<sup>17</sup> being accepted as valid.

Prior to the validity analysis, an exploratory factor analysis (EFA) was carried out, obeying the following sequence<sup>18</sup>: verification of the adequacy of the database to the method, choice of the extraction technique and

the method of data rotation<sup>1</sup>. For the sample adequacy measure, the Kaiser-Meyer-Olkin index (KMO) was calculated and, as a sphericity index, the Bartlett test (BST), with significance level  $p < 0.05$ . The Principal Component Analysis method was used to establish the number of factors to be extracted, having as parameter the choice of items with values of factorial loads  $> 0.50$ <sup>17</sup> and commonality  $> 0.40$ <sup>17</sup>. The Varimax rotation method was applied to the data, with Kaiser normalization<sup>18</sup>.

The validity, in turn, was investigated from the confirmatory factor analysis (CFA), adopting the maximum likelihood method<sup>1</sup> to confirm the structure proposed by the EFA and adjustments of the measurement and structural models in the structural equation modeling (SEM), considering the multivariate normality of the data. For the convergent validity, factor loads  $\geq 0.50$  and the composite reliability for each of the factors were considered<sup>17</sup>. The discriminant validity, in turn, was analyzed from the comparison between estimates of extracted variance and shared variance of the constructs. The following indicators and adjustment values were used<sup>19,20</sup>: Chi-square ratio by degrees of freedom ( $\chi^2 / gl$ ), admitting up to five; *Comparative Fit Index* (CFI) and *Tukey-Lewis Index* (TLI), both greater than 0.90; and *Root-Mean-Square Error of Approximation* (RMSEA), with a 90% confidence interval (CI90%), with a value of up to 0.10 being adequate.

For all statistical analyzes the software *Statistical Package for the Social Sciences* (SPSS) for Windows 2010 (version 21.0) and *Analyzes of Moment Structures* (AMOS) version 18.0 were used.

## RESULTS

The dimensions of the AQSF-Neuroped and its respective items have undergone content validation. Based on the experts' evaluation, a higher total agreement rate was obtained between the items, ranging from 71.43% to 92.86% in the first dimension; 68.18% and 86.36%, in the second; and between 82.61% to 100%, in the last one. Regarding non-agreement, 14.29% of the items were judged by 2 specialists in D1, 4.55% by 2 specialists in D2 and 4.35% by only one specialist in D3, with recommendations for adjustments in the wording

for greater clarity. In D1, the division of one item and the exclusion of five others was suggested, while in D2, the inclusion of a new item was suggested. The suggestions were analyzed and accepted according to the pertinence of the placements and the agreement between at least three of the five judges.

Through the FG, the mothers believed that there was clarity in the proposed dimensions and that all items were important to assess the quality of the services of neuropsychiatric physiotherapy. There was only a suggestion for adding an item, which was accepted and adjusted in the writing of an existing item (Q49). After content validation was completed, a new version of the instrument with 53 items was obtained. Progress was made with the assessment of the psychometric properties of the instrument.

The KMO index was 0.917 and Bartlett's sphericity test resulted in  $\chi^2 = 4540.178$  ( $p < 0.001$ ). Through the EFA, a more adequate model was obtained considering the retention of four factors and the exclusion of nine items with factorial loads below 0.50 and / or communalities below 0.40.

The factors presented 52.29% of the total variability of the variables, in which, from the orthogonal Varimax rotation, the first factor carried about 22.16% of the variance; the second, 15.46%; the third, 7.78%; and the fourth, 6.88%. When analyzing the internal consistency, considering Cronbach's alpha, the following indices were obtained: 0.93 (Factor 1), 0.88 (Factor 2), 0.78 (Factor 3) and 0.81 (Factor 4).

Evidence of validity based on the instrument internal structure was verified using the CFA. The final standardized solution of the model was obtained, whose items showed strong correlations, according to the high factor loads ( $\lambda \geq 0.50$ ), thus confirming the existence of a good conceptual understanding of the factors and their variables (Table 1). Only one variable (Q22) had a lower load, despite being significant ( $p$ -value  $< 0.01$ ), and was therefore removed from the final model.

**Table 1.** Statistics of the instrument internal structure, considering the four factors in the final model obtained

<sup>1</sup> Composite Reliability	Factor			<sup>2</sup> Nstand -Est	Standard Error	<sup>3</sup> C.R. (t)	<sup>4</sup> Stand_St	p-value
0,857	Q41	<---	Factor1	1			0,712	
	Q47	<---	Factor1	1,124	0,097	11,547	0,705	***
	Q42	<---	Factor1	1,083	0,074	14,614	0,725	***
	Q45	<---	Factor1	1,18	0,110	10,753	0,711	***
	Q46	<---	Factor1	1,201	0,112	10,77	0,715	***
	Q40	<---	Factor1	1,011	0,085	11,966	0,632	***
	Q39	<---	Factor1	0,898	0,08	11,275	0,620	***
	Q54	<---	Factor1	1,209	0,113	10,651	0,702	***
	Q51	<---	Factor1	1,098	0,104	10,602	0,698	***
	Q48	<---	Factor1	1,12	0,111	10,109	0,672	***
	Q49	<---	Factor1	1,585	0,157	10,073	0,664	***
	Q34	<---	Factor1	1,101	0,099	11,157	0,741	***
	Q50	<---	Factor1	1,185	0,125	9,453	0,632	***
	Q53	<---	Factor1	1,563	0,159	9,814	0,647	***
	Q55	<---	Factor1	1,079	0,116	9,328	0,614	***
0,855	Q24	<---	Factor2	1			0,582	
	Q21	<---	Factor2	0,846	0,123	6,862	0,531	***
	Q26	<---	Factor2	0,835	0,1	8,347	0,590	***
	Q19	<---	Factor2	0,859	0,109	7,894	0,643	***
	Q38	<---	Factor2	1,084	0,147	7,365	0,582	***
	Q18	<---	Factor2	0,719	0,107	6,743	0,519	***
	Q17	<---	Factor2	1,11	0,159	6,98	0,545	***
	Q23	<---	Factor2	1,062	0,16	6,62	0,505	***
	Q28	<---	Factor2	0,83	0,111	7,497	0,597	***
	Q16	<---	Factor2	0,851	0,106	8,011	0,659	***
	Q43	<---	Factor2	0,784	0,108	7,227	0,573	***
	Q44	<---	Factor2	0,727	0,103	7,032	0,550	***
0,777	Q5	<---	Factor3	1			0,738	***
	Q37	<---	Factor3	0,691	0,07	9,939	0,606	***
	Q4	<---	Factor3	0,856	0,085	10,072	0,809	***
	Q32	<---	Factor3	0,571	0,072	7,901	0,563	***
0,816	Q2	<---	Factor4	1			0,824	***
	Q1	<---	Factor4	0,977	0,119	8,21	0,837	***

Source: Research data (2017).

<sup>1</sup>Values greater than 0,70<sup>17</sup> are acceptable; <sup>2</sup>Nonstandard estimates (Covariance);<sup>3</sup>Student's t-test statistics. Values  $t > 2,58$  (\*\*\*)  $p$ -value  $< 0,01$ ;<sup>4</sup>Standardized statistics (Correlation).

The convergent validity was confirmed by the strong factorial loads ( $\geq 0.50$ ) and by the composite reliability for each of the factors, considering that all presented estimates above 0.70 (Table 1). The discriminant validity, in turn, was evidenced by obtaining estimates of extracted variance higher than those obtained by the shared variance between the factors (Table 2).

**Table 2.** Comparison between the extracted variance (main diagonal) and the shared variance of the measurement model

	Factor 1	Factor 2	Factor 3	Factor 4
Factor 1	0,463			
Factor 2	0,415	0,331		
Factor 3	0,298	0,312	0,471	
Factor 4	0,154	0,165	0,232	0,690

Source: research data, 2017.

Regarding the indexes of model fitting, all presented results above the estimated value (Table 3).

**Table 3.** Adjustment indicators of the final model obtained by the Confirmatory Factor Analysis

Adjustment Indicator	Criteria for good model adjustment <sup>19,20</sup>	Final Model ( <sup>4</sup> SERV_QUAL)
Discrepancy function: $\chi^2$	—	713,117 $p$ -value < 0,01
Normed chi-square ( $\chi^2/gf$ )	Value between 1 and 5	713,117/465 = 1,534
<sup>1</sup> RMSEA	between (0,00; 0,10] $H_0$ : RMSEA ≤ 0,05	0,046 $p$ -value = 0,848
<sup>2</sup> TLI	Above 0,90	0,927
<sup>3</sup> CFI	Above 0,90	0,936

Source: Research data (2017).

<sup>1</sup> Root-Mean-Square Error of Approximation; <sup>2</sup> Tukey-Lewis Index; <sup>3</sup> Comparative Fit Index.

<sup>4</sup> Service quality (endogenous construct or dependent variable).

The dimensions started to be titled and ordered according to the new structure obtained: “technical” (factor 1); “interpersonal” (factor 2); “organizational I” (factor 3) and “organizational II” (factor 4). The choice of nomenclatures was due to the fact that each of the new factors is made up of more than 50% of the variables originally proposed in the dimensions of the initial version of the instrument.

The final structure of the AQSF-Neuroped now consists of 33 items, organized according to the new sequence established for each of the four factors, as shown in Chart 1.

**Chart 1.** Final version of the AQSF-Neuroped instrument, validated in João Pessoa, Paraíba, Brazil, to assess the quality of Neuropaediatric Physiotherapy services, based on the perception of caregivers

D1: TECHNICAL DIMENSION	(Continue)				
	VERY BAD	BAD	AVERAGE	GOOD	VERY GOOD
1. Ability of the Physiotherapist(s) to deal with the child.	1	2	3	4	5
2. Confidence of the Physiotherapist(s) when answering questions related to the child's diagnosis, evolution and treatment.	1	2	3	4	5
3. Ability of the Physiotherapist(s) to perform the techniques in the assistance.	1	2	3	4	5
4. Availability of the Physiotherapist(s) to clarify doubts related to the child's diagnosis, evolution and treatment.	1	2	3	4	5
5. Clarity in answering questions related to the child's diagnosis, evolution and treatment.	1	2	3	4	5

(Conclusion)

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6. Physiotherapist(s)' knowledge of the child's case.	1	2	3	4	5
7. Confidence transmitted by the Physiotherapist(s) in the consultations.	1	2	3	4	5
8. Support/incentive for the co-participation of the guardian/caregiver in the child's rehabilitation by the Physiotherapist(s).	1	2	3	4	5
9. Physiotherapist(s)' individual attention to the child during the assistance.	1	2	3	4	5
10. Physiotherapist(s)' guidelines for continuing treatment at home.	1	2	3	4	5
11. Physiotherapist(s)' concern with knowing the child's clinical and family context (clinical history, housing conditions, adaptation of the environment to special needs, etc.)	1	2	3	4	5
12. Attention of the Physiotherapist(s) in listening to the child's guardian/caregiver.	1	2	3	4	5
13. Physiotherapist(s)' support/Incentive to the guardian/caregiver regarding the acceptance of the child's condition and his/her permanence in physiotherapy.	1	2	3	4	5
14. Periodic evaluations in the child's rehabilitation by the Physiotherapist(s).	1	2	3	4	5
15. Evolution of the child with the Physiotherapy offered in this service (response to treatment).	1	2	3	4	5
D2: INTERPERSONAL DIMENSION	VERY BAD	BAD	AVERAGE	GOOD	VERY GOOD
16. Supply of drinking water.	1	2	3	4	5
17. Availability of seats in the waiting room.	1	2	3	4	5
18. Ventilation in assistance environments.	1	2	3	4	5
19. Physical facilities (distribution of furniture, electronic devices, etc.).	1	2	3	4	5
20. Number of Physiotherapists for patient demand.	1	2	3	4	5
21. Size of the environments of this service (waiting room, assistance room, restrooms, entrance environment, etc.).	1	2	3	4	5
22. Availability of hand hygiene devices in different environments.	1	2	3	4	5
23. Materials to distract the child in the waiting room (toys, games, etc.).	1	2	3	4	5
24. Availability of an appropriate care environment for the child.	1	2	3	4	5
25. Cleanliness of the environments of this service (waiting room, assistance room, restrooms, entrance area, etc.).	1	2	3	4	5
26. Availability of resources in child care (Swiss ball, roller, toys, stretchers, beds or mats, etc.).	1	2	3	4	5
27. State of conservation of the resources used in children's care (Swiss ball, roller, toys, stretchers, beds or mats, etc.).	1	2	3	4	5
D3: ORGANIZATIONAL DIMENSION I	VERY BAD	BAD	AVERAGE	GOOD	VERY GOOD
28. Waiting time to be assisted at each session.	1	2	3	4	5
29. Physiotherapist(s)' punctuality in the attendance.	1	2	3	4	5
30. Organization of this service in relation to attendance (order of arrival or scheduled time)..	1	2	3	4	5
31. Professionals' welcoming in this service, from reception.	1	2	3	4	5
D4: ORGANIZATIONAL DIMENSION II	VERY BAD	BAD	AVERAGE	GOOD	VERY GOOD
32. Waiting time between the search for the service and the first appointment.	1	2	3	4	5
33. Process to get a place in this service	1	2	3	4	5

Source: Created by the authors (2017).

## DISCUSSION

Based on the adopted methodology, it was possible to develop an instrument for assessing the quality of neuropsychiatric physiotherapy services, whose internal structure showed evidence of reliability and validity. The steps performed in the process were relevant to the construction and validation<sup>1,18</sup>.

The literature review pointed out the incipience of production with the thematic assessment of the quality of neuropsychiatric physiotherapy services<sup>6</sup>, however, it made it possible to define the items that would comprise the instrument. According to Carpenter<sup>1</sup>, a literature review should be considered when developing measures to map its structure, in order to create items that reflect the theoretical understanding of each dimension.

In order to define the instrument structure, the feedback from experts and representatives of the target audience was also considered, aiming at its theoretical improvement<sup>1</sup>, through content validation. Sending instructions to the judges, informing them about the evaluation procedures, allowed to facilitate and homogenize the validation process<sup>13</sup>. The number of specialists and the criteria used for the evaluation were in line with the literature<sup>14,15</sup>. The main contributions of this stage were the alteration of item writing to facilitate its reading and interpretation. Content validation, through expert evaluation, is seen as a fundamental step in the development of new instruments, allowing the evaluation of abstract concepts, indicating whether the items chosen for their construction represent the dimensions to be evaluated<sup>2</sup>.

The introduction of content validation from mothers is justified by allowing users to contribute to this process, as they are the main actors involved in assessing the quality of children's physical therapy services<sup>21</sup>. Commonly, after validation by specialists, pre-test<sup>1</sup> and the application of the pilot test<sup>22</sup> have been used before data collection, in order to verify that the structure is adequate and that all items are easily understood, to avoid measurement errors<sup>1</sup>.

According to Carpenter<sup>1</sup>, the pre-test can be performed through focus groups. Thus, the FG carried out in this study fulfilled this function and revealed that

the mothers showed no doubts about the interpretation of the items, in addition to being able to contribute to the enrichment of the instrument through suggestions and confirm the importance of the investigation proposed by the instrument. Positive comments were made regarding its appearance and language.

However, the innovative aspect of using a FG, which is still incipient, in the process of building and validating instruments, stands out. However, previous experiences show that this method has been applied in studies as part of the validation process, being carried out, in some cases, after the experts' evaluation stage<sup>16,23</sup>, representing, therefore, a new methodological possibility<sup>24</sup>.

It appears that the main public used to evaluate the services has been made up of its users<sup>6</sup> or guardians and caregivers, when the user audience is children<sup>21</sup>. In turn, determining the magnitude of the sample is an important step in the development of scales<sup>1</sup>, since the sample size must obey a minimum of five respondents for each item of the instrument<sup>1,17</sup>, as it was obtained in this study.

In view of the importance of evaluating psychometric aspects to guarantee the quality of scales<sup>25</sup>, surveys of validation of questionnaires in health also used, in order to measure these aspects, reliability<sup>26,27</sup> and validity, through exploratory<sup>26,27, 28</sup> and confirmatory<sup>26,28</sup> factor analyzes. For Pilatti, Pedrosa and Guttierrez<sup>14</sup>, validity and reliability are the aspects that are most related to the quality of an evaluation instrument. It is necessary to consider, however, that these two properties play complementary roles to each other, and it is important to analyze both to ensure greater reliability in the validation process<sup>28</sup>.

The adequacy of the data was verified using the KMO index and Bartlett's sphericity test, which are the most used measures to identify the degree of adjustment, so that the data can be successfully used for factor analysis<sup>17</sup>. On the other hand, the exclusion of items with a factor load less than 0.50 and communalities below 0.40 is justified by the lower degree of significance for the composition and theoretical understanding of the dimensions for which they were proposed<sup>3</sup>. However, the value of the accumulated variance, being 52.29% in



the study, should not be used rigorously in the extraction of items, as the analysis of the value of loads would be enough to determine the variables that should encompass the instrument<sup>18</sup>.

Regarding the reliability of the items, all factors presented a coefficient above the acceptable (0.70)<sup>17</sup>, among which, factor 1 obtained an excellent index<sup>17</sup>, while the consistency of factors 2 and 4 was satisfactory<sup>17</sup>. It implies that all items are capable of consistently measuring their respective dimensions<sup>17</sup>, and are therefore reliable<sup>29</sup>. Other studies have used Cronbach's alpha to measure the reliability of instruments<sup>29,30</sup>.

The labeling of the factors maintained the denomination initially proposed<sup>11</sup>, since the fourth factor added by the EFA also maintained the original predetermined labeling, considering the doubling of the nomenclature of one of the dimensions. In this perspective, the "technical dimension" is a component that adds items related to the choice of techniques to be used and the way they are performed<sup>11</sup>. On the other hand, the "interpersonal dimension" corresponds to non-technical properties of care, encompassing factors associated with users' satisfaction<sup>11</sup>. The "organizational dimension", in turn, concerns, among other aspects, the overall care, continuity of care and accessibility<sup>11</sup>. After EFA this dimension was broken down to include the last two factors of the instrument.

EFA is recommended to define the scale structure<sup>1</sup>, while CFA must be conducted to confirm or reject the pre-established internal structure<sup>1,17</sup>. To be validated, it is suggested that the entire scale be subjected to a confirmatory factor analysis<sup>1</sup>. Therefore, from the final standardized solution obtained by the CFA, it was possible to confirm the existence of a good conceptual understanding between the factors and their respective variables<sup>17</sup>.

Hair et al.<sup>17</sup> indicate the verification of measurement measures using convergent and discriminant validity, by estimating factor loads, extracted variance (EV) and construct reliability, as used. It is considered that the EV estimates must be higher than those of the shared variance<sup>17</sup>. The factors presented evidence of discriminant and convergent validity, that is, each dimension of the instrument is unique and

consists of correlated items<sup>1</sup>, capable of explaining what is intended to be measured within the respective dimension.

Concerning the SEM, some indexes were considered for the absolute fitting of the model, such as the discrepancy function, the normalized chi-square and the mean square root of the approximation errors, so that all presented values that indicate a good fitting in the model obtained by the CFA<sup>17,19</sup>.

For the construction of this instrument, the perception of caregivers was chosen, considering the importance of their evaluation as users of services. It is recognized, however, that for a broader evaluation of the service, it is also necessary to evaluate the perspective of workers and managers, which points to the possibility of other studies that can expand the evaluation in this sense.

Despite being directed to neuropsychiatric physiotherapy services, the construction of the AQSF-Neuroped represents an important step both with regard to the assessment of physiotherapy services and in the instrument validation process.

Hopefully the results of the evaluation will assist managers and political actors in making decisions in favor of improvements in the quality of services offered to children in rehabilitation, considering that the results can reveal dimensions of functioning, encompassing assistance, structural, social and organizational aspects, in addition to warning about the need for greater investments in research in health assessment.

## CONCLUSION

From the methodology applied to the preparation and validation of the AQSF-Neuroped, it can be said that the results show evidence of reliability and validity, based on the content and the internal structure of the instrument.

Therefore, it was possible to develop a reliable instrument to assess the quality of neuropsychiatric physiotherapy services based on the perception of caregivers, which can be used in health contexts similar to the subjects of this study, as a tool for planning and managing services.

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