

“PCATool version to professionals in the primary care of the elderly”: adaptation, content analysis and first results

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Abstract *The objective of this study was to adapt the instrument “Primary Care Assessment Tool (PCATool)-professional version” to measure the performance of the care provided by Primary Health Care (PHC) to the health of the elderly, from the perspective of professionals. The original instrument was critically analyzed by specialists with experience in Gerontology and PHC in relation to the health specificities of the elderly, with 64 syntactic-semantic adaptations and 28 inclusions of new parameters. The adapted instrument was applied to 105 health professionals from PHC in Campinas-SP and, compared to the original instrument, the adaptation proved to be able to distinguish the new parameters with statistically significant differences, and in the sample of the analyzed professionals the performance obtained was better evaluated in relation to “Accessibility” and “Comprehensiveness” attributes, and worse evaluated in the attributes “Longitudinality”, “Coordination”, “Essential and General Scores”. In the adapted instrument, it was verified adequate results in terms of content validity and reliability, good discriminative capacity in relation to the specificities of the elderly population, and potential to become a national instrument for evaluating PHC in care to the elderly.*

Key words *Primary Health Care, Patient Health Questionnaire, Health Services for the Aged, PCATool, Primary Care Assessment Tool*

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Introduction

Population aging has generated significant demands for the Brazilian Unified Health System (SUS, in Portuguese). In Brazil, in 2010, there were approximately 100 adolescents for every 39 elderly individuals, estimating that, in 2040, there will be approximately 153 elderly individuals for every 100 adolescents¹. According to the Ministry of Health, the population of Brazil in 2019 was 212 million, of which 28 million were elderly individuals, with a forecast in 2039 of the number of people over 65 years of age surpassing the number of young people up to 14 years of age².

In the aging process that occurs in Brazil and in other developing countries, there are found peculiar characteristics of demographic transition and significant social inequalities³. However, few studies have been dedicated to measuring the performance of taking care of the elderly within the Primary Health Care (PHC) strategy. The information is geared toward the general adult population and fails to contemplate the specific aspects of the subgroup of advanced age ranges. This affirmation suggests the need for an inclusive evaluation instrument for the characteristics of the elderly population and one that enables the objective analysis of elderly care, the discussion about the limits of primary care for this group, the expected competencies for PHC professionals, as well as the roles of the other main units of the “Health Care Network” of an integrated health system in the healthcare network⁴.

The PHC is an organized and regionalized strategy to answer to the major part of the demands of the community regarding health and well-being⁵. The adaptation of the health service so that it is qualified as a primary care provider, according to Bárbara Starfield⁶, stems from a group of essential attributes: care provided to the individual’s access to the first contact with the health system, longitudinality, completeness, and coordination. There are also two additional derivative attributes: family counselling and community orientation. This group of essential attributes and their derivatives are defining factors of PHC, that is, their presence is related to the broad concept of the provision of Primary Care.

To evaluate the PHC, specific instruments are used, according to that reported in the literature, among which are the Primary Care Assessment Tool (PCATool)⁷, a pre-validated instrument, of public use and domain, and adopted by the World Health Organization (WHO) to evaluate

primary care. The PCATool consists of evaluation items of service providers based on essential attributes and their derivatives, which can be measured from the vantage point not only of managers and professionals from a wide range of healthcare fields, but also from the point of view of the users⁸. The use of the PCATool orchestrates the measurement of data referent to the PHC attributes and allows the resoluteness of the care, orientation, and training of the multidisciplinary teams and managers, as well as the stimulus for research related to public health, to proceed⁹.

The PCATool is an instrument “translated and adapted in many countries with different health systems, including Spain, Canada, South Korea, China (Hong Kong), Argentina, Puerto Rico, and Uruguay”¹⁰. In Brazil, it was validated in the following versions: PCATool-Brazil¹¹, PCATool Children¹², PCATool Professionals¹⁰, PCATool - Oral Health Brazil¹³ for adult users, extensive version; PCATool - Brazil, oral health for dental professionals, extensive version¹⁴.

Following the example of the PCATool Children¹², the present work proposed to evaluate and adapt the PCATool Professionals¹⁰, in Portuguese, presenting the version PCATool “professionals in elderly health care” (PCATool-PEHC), with specific attributes geared toward the older age range population, particularly to the very elderly.

Materials and methods

Study design

The study was conducted in the City of Campinas, in the State of São Paulo, Brazil, which was chosen to test the methodology due to the facility of access to the Family Health Strategy (FHS) teams, because of the diversity of incomes and age ranges, and because it had a local health system with a reasonable historical tradition in the development of PHC.

To better identify the instruments, that is, that which served as the model for the adaptation and the already adapted model, the following facilitating nomenclatures were established: PCATool-Professional equivalent to the original (PCATool-PEquivalent), which contains only essential syntactic and semantic changes; and PCATool Professionals in elderly health care (PCATool-PEHC), which contains additional items according to the suggestions made by the committee of specialists.

Adaptation of the Instrument

The methodology used for the adaptation and validation of the content of the PCATool-PEHC, as well as the evaluation of the PHC, according to the chosen sample, occurred in the following stages:

In the first stage, the original instrument, the population to be studied, and the intended aims in the adaptation (contemplate, in a consensual manner, the particularities of the healthcare needs of the elderly population in the PHC context) were forwarded to five specialists with experience in the area of health and aging: the inclusion criteria of these professionals were: 1- have no conflicts of interest or prior publications with the researcher or with other participants, 2- present degree and experience in Geriatrics and Gerontology, and 3- have prior experience in working in PHC services. In this stage, the analyses of the original instrument were carried out independently by each of the specialists, who proposed initial additional changes to the attributes, without excluding the parameters of the original instrument. The adaptation desired in the instrument, with aims that were well-explained to the specialists, could be of three types: syntactic changes, adapting the question to the situation closest to that of the elderly individual, such as the change in nomenclature of the terms “elderly” and/or “caretaker”; semantic changes, such as contemplating the situation of “retirement” or “work” as a source of income; and, finally, the addition of items that contain the particularities of the care provided to the elderly and that are not present in the original instrument¹⁵.

The suggestions were sent to the main researchers of the Project, who proceeded with the compilation, re-evaluation, and critical analysis, given that the inserted suggestions were once again forwarded to the group of specialists so that their agreements and divergences could be re-evaluated. This process was repeated until the adaptation of the instrument, accepted consensually among all of the specialists, could be obtained (comparison of the instruments and final version available in <https://doi.org/10.48331/scielodata.P2GFCB>)^{8,16}.

Pre-Test, Data collection, Content validity, and Reliability

The second stage consisted of the analysis of the content validity and reliability for the adapted version. Initially, the instrument was applied

to a group of 20 professionals in Basic Health Units (BHUs) from Campinas, for the analysis of the time of application, validity of data collection, and criticism on the part of the professionals who answered the instrument, of points of difficulty, or that needed adjustment. After this analysis of feasibility, the instrument was applied to a group of 105 professionals from the FHS teams, according to the convenience sample, that is, professionals who accepted to participate in the study in the BHU designated by the city health management¹⁷. The application complied with the manual's instructions⁸.

For each item of the questionnaire, the participants answered three questions referent to the clarity of language (CL), practical pertinence (PP), the Theoretical Relevance (TR), attributing to each of these aspects a value of 0 to 10. From these obtained results, the content validation¹⁸ of the adapted version was conducted, according to the procedures already well structured in the literature¹⁹. The values referent to the answers to the instrument *per se* were also computed in the databank, given that the answer options, in a Likert scale, according to the methodology of the already validated versions of the PCATool, were: certainly yes (4 points), probably yes (3 points), probably no (2 points), certainly no (1 point), and I don't know/I don't remember (value to be adjusted according to the test application manual). To calculate the scores of the adapted instrument, “PCATool-PEHC”, each attribute was evaluated by the sum of the answers divided by the number of items of the respective attribute, thus obtaining a simple average, according to that recommended by the Manual (further information on the methodology of score calculations can be found in <https://doi.org/10.48331/scielodata.P2GFCB>)^{8,16}.

Statistical and comparative analyses

The quality of the “PCATool version Professionals who take care of an elderly person”, which was also presented, was evaluated based on the premise that the instrument should obtain a high index of content validity and reliability, and simultaneously, differ in relation to the original instrument, showing that the adaptation promoted an evaluation of different aspects that had not been contemplated²⁰.

For the analysis of reliability, the Cronbach Alpha coefficient was used, which is the average of the correlations between the items that make up part of the instrument (attributes), serving as

the parameter for the verification of discrepancies or redundancies among the items that are a part of the attributes. As a general rule, low accuracy was considered to be between 0 and 0.21; reasonable from 0.2 to 0.40; moderate from 0.41 to 0.60; substantial from 0.61 to 0.80, and finally, nearly perfect, above 0.81²¹.

In other words, the best accuracy must be greater than 0.81 if the scale is widely used; however, values above 0.61 already indicate consistency. This study thus considered an adequate internal consistency to be when found to be above 0.61, indicating that the questions are similar or homogenous without being redundant. Attributes with a small number of items can, however, be influenced, presenting low values of accuracy without a negative meaning for the interpretation of its importance in the instrument.

For the comparative evaluation between the PCATool-Professionals and the instrument adapted here, and considering that no items from the original instrument were eliminated, this study thus proceeded with the statistical association of the average values obtained in the scores of the original instrument and in the adapted instrument. For the statistical analyses, the IBM SPSS® software, version 24, was used. The results were presented in relation to the averages, and the distribution of the averages of each attribute was verified by means of the Shapiro-Wilk and Kolmogorov normality tests. To compare the variables with parametric distribution, the T-test was used, while for the non-parametric variables, the Wilcoxon Test was used. Results of p-value of less than 0.05 were interpreted as showing a difference between the attributes of the compared instruments (rejection of the hypothesis that there were no differences).

All of the participants signed a free and informed consent form after having received due clarification about the study. The professionals who were unable to answer the interview at the specific time scheduled another day to meet with the interviewer.

To meet the ethical criteria, this study followed the recommendations set forth by the National Health Council, filed under Resolution number 466/2012, with the research protocol submitted for approval by the Committee for Ethics in Research involving Human Beings from UNICAMP and CETS/PMC (Center of Education of Health Workers of the City of Campinas), logged under protocol number 3.004.020.

Results

Instrument, Participants, Content validity, and Reliability

The PCATool-PEHC consisted of 105 items distributed throughout the attributes (the PCATool-Professionals contains 77 items, according to the presentation from the Ministry of Health)⁸, given that 64 items were adapted syntactically and semantically and another 28 items were added according to the proposal from the group of specialists. The syntactic and semantic changes were adaptations of the context, without compromising the meaning contained in each item (Table 1). The PCATool-PEHC was applied to a group of 105 professionals from the BHUs, including 14 community agents, 31 nurses, 25 doctors, 27 professionals from the higher education category, and 8 professionals from the high school level categories, distributed among the BHUs of Jardim Eulina, Jardim Capivari, Jardim Aurélia, and Distrito de Barão Geraldo, in Campinas-SP, Brazil. The data were collected between May 2019 and March 2020, having received approval from CETS/PMC.

The “clarity of language”, the “practical pertinence”, and the “theoretical relevance”, evaluated individually for each one of the PCATool-PEHC attributes, was shown through the Content Validity Index (CVI), according to that observed in Table 2. All of the indexes obtained adequate values of above 0.8 in the attributes.

The reliability values were satisfactory and consistent for the attributes of “Longitudinality”, “Coordination - integration of care”, “Completeness - available services and services rendered”, as well as “Family counselling and community orientation”. The lower indexes of reliability were obtained in relation to Accessibility and Coordination - system of information; however, the items were maintained through the criteria of conceptual relevance related to the definition of PHC, proposed by Starfield⁶.

Testing and results of the PCATool-PEHC

Statistically, there was a difference in the calculated answer values in all of the attributes, when comparing the PCATool-PEHC and the PCATool-PEquivalent, with the exception of “Family counselling”, an attribute in which there was an increase in only one item referent to the orientation of the caretaker. The PCATool-PEHC obtained higher averages scores in the attributes

of “Accessibility” and “Completeness - available services”, whereas in relation to the other attributes, the adapted version of PCATool-PEHC obtained lower average scores for “Longitudinality”, “Coordination - integration of care”, “Coordination - system of information”, “Completeness - services rendered” and “Community orientation”. The Essential (average of the first six attributes) and Overall (average of all of the attributes, including the derivative attributes) of

Table 1. Distribution of the number of items maintained or changed in the evaluation domains of the PCATool.

Domains	PCATool-Professionals	PCATool-PEHC*	Items Maintained Unchanged	Adapted Items in Syntax/Semantics	Items Included in the Adaptation
A - Accessibility	9	11	2	7	2
B - Longitudinality	13	15	-	13	2
C - Coordination - Integration of Care	6	9	-	6	3
D - Coordination - System of Information	3	5	-	3	2
E - Completeness - Available Services	22	30	9	13	8
F - Completeness - Services Rendered	15	24	2	13	9
G - Family Counselling	3	4	-	3	1
H - Community Orientation	6	7	-	6	1
Total	77	105	13	64	28

*PCATool-Professionals-Adapted Brazilian version, with the addition of items according to the evaluation of the Committee of Specialists.

Source: Authors.

Table 2. Calculation of the Content Validity Index and Reliability for each essential and derivative attribute of the adapted instrument (n=105).

Domains or Attributes of Primary Health Care	Clarity of Language	Practical Pertinence	Theoretical Relevance	Content Validity Index	Reliability - Cronbach Alpha coefficient
A - Accessibility	0.96	0.82	0.83	0.87	0.470
B - Longitudinality	0.98	0.92	0.93	0.94	0.757
C - Coordination - Integration of Care	0.97	0.89	0.93	0.93	0.636
D - Coordination - System of Information	0.98	0.92	0.94	0.94	0.539
E - Completeness - Available Services	0.98	0.93	0.94	0.95	0.897
F - Completeness - Services Rendered	0.95	0.95	0.96	0.95	0.936
G - Family Counselling	0.99	0.97	0.98	0.98	0.778
H - Community Orientation	0.99	0.94	0.95	0.96	0.714
Essential Score	NA	NA	NA	NA	0.95
Overall Score	NA	NA	NA	NA	0.95
Total (n=105)	0.99	0.93	0.94	0.95	NA

Source: Authors.

the PCATool-PEHC were of 5.85 and 6.02, respectively, values lower and statistically different from the scores obtained in PCATool-PEHC and the PCATool-PEquivalent (Table 3).

Only the attributes of “Completeness - Available services” (6.61) and “Services rendered” (6.79) reached the scores above 6.6, considered to be satisfactory. Considering that the pertinence and relevance of the proposition of the group of specialists for the PCATool-PEHC instrument were adequately directed to contemplate the health needs of the elderly population, these values corroborate the presence of the statistical differences between the PCATool-Professionals and the PCATool-PEHC.

Discussion

The “PCATool - version Professionals who take care of an elderly person” was adapted by means of the PHC evaluation instrument from the point of view of the professionals¹⁰ and elaborated by a group of specialists with experience in the health areas of Gerontology, Geriatrics, and Primary Care. The initial analyses of the adapted instrument showed adequate indexes of CL, PP, TR, and reliability, compatible with the prior validation of the original instrument and showed that the instrument was capable of identifying differences in relation to the providing of care for the elderly. The characterization of the

demands and specific aspects in health within the more advanced age ranges, in the contexts of rapid population aging and PHC organization, can offer data for the improvement of the services rendered, monitoring of the effectiveness of the care provided, and promotion of healthy aging in the population²².

Peculiarities of the elderly population, such as the decline in biological functions, the compromising of the musculoskeletal system, sensory alterations, the greater prevalence of the loss of functionality, and the emergence of multiple chronic diseases, end up modifying and shaping demands in BHUs and make it necessary to create care lines and health indicators capable of identifying and discussing unavoidable risks and harm²³. The Comprehensive Geriatric Assessment (CGA) seeks to deal with the work centered around elderly people in an integrated and multidisciplinary manner²⁴. Following in line with the CGA, instrument inserted in the work routine for Gerontologists and Geriatric professionals, there are specific elements of evaluation that can be incorporated in the “PCATool version professionals who take care of elderly people”. In this sense, the specialists highlighted a greater number of suggestions to be inserted both in “Completeness - available services” as well as in “Completeness - services rendered” and, to a lesser extent, adding “Accessibility”, “Longitudinality”, “Coordination - integration of care”, and “Coordination - system of information”. Among

Table 3. Comparative analysis of the instruments PCATool-PEquivalent and PCATool-PEHC, presenting the average values of the attributes of Primary Health Care, Essential Score, and Overall Score in a sample of professionals from the basic health network, City of Campinas, SP, Brazil, 2019 (n=105).

	PCATool-Equivalent*	PCATool-PEHC**	p_value
A - Accessibility	3.48 ± 1.11	4.07 ± 1.06	<0.001
B - Longitudinality	6.39 ± 1.16	5.81 ± 1.12	<0.001
C - Coordination	5.89 ± 1.60	5.51 ± 1.37	<0.001
D - Coordination	7.89 ± 1.82	6.29 ± 1.67	<0.001
E - Completeness	6.40 ± 1.33	6.60 ± 1.32	<0.001
F - Completeness	7.04 ± 1.76	6.78 ± 1.65	<0.001
G - Family Counselling	7.57 ± 1.86	7.59 ± 1.82	0.767
H - Community Orientation	5.67 ± 1.56	5.49 ± 1.55	<0.001
Essential Score	6.18 ± 0.99	5.84 ± 0.97	<0.001
Overall Score	6.29 ± 1.01	6.02 ± 0.99	<0.001

Note: The scores assume values of 0 to 10. *PCATool-PEquivalent, with the same number and distribution of items in each domain, with adaptations in syntax and semantics for the elderly. **PCATool-Professionals-Adapted Brazilian Version, with addition of items according to the evaluation of the Committee of Specialists. Descriptive results in average±standard deviation. Wilcoxon test and χ^2 -Test for paired samples. Significance level $p < 0.05$.

Source: Authors.

the characteristics pointed out by the group of specialists, it is important to point out the need to identify problems with the musculoskeletal system or postural instability, which make the movement of carrying out of daily activities difficult; advice for the use of canes or walkers; advice and inclusion in appropriate physical activity groups; advice about reduced memory or the risk of falls; advice about guardianship, declared will, and anticipated guidelines of willingness; advice about palliative care and end-of-life measures; advice for caretakers concerning how to give a bath in bed and sleep hygiene; triage of depression symptoms, cognitive deficit, and functional deficit; in other words, all important and peculiar aspects of an elderly individual. Although these needs have been pointed out in the national and international documents²⁵ guiding public policies for the elderly, we observed that they are not present in the instrument PCATool-Professionals, which led to the incorporation of new elements for a version of the PCATool that evaluates the PHC according to the specific aspects of this population²⁶.

Regarding the aspects of the validity of the methodology used, the present study considers an adequate internal consistency to be when a Cronbach Alpha index of above 0.61 is obtained, which indicates that the questions are similar or homogenous without being redundant²¹. Although the internal consistency of some attributes (“Accessibility” and “Coordination - system of information”) have not reached an adequate level, this result does not differ from that found in the original instrument used as the reference¹⁰. These attributes, with a low value of reliability, structured by such items as, for example, the maintenance of a health service open at night and on weekends, same-day care, and referral to other BHUs of the health network, were maintained, considering their prior existence in the original instrument. This enables the maintenance of comparability with results obtained in other regions and countries, as well as measures aspects considered important for the PHC. The statistical model has indeed demonstrated that the removal of the questions would not improve the consistency of the instrument.

The comparative statistical analyses between the PCATool-PEHC and the PCATool-PEquivalent (original instrument modified only with the syntactic and semantic corrections, adjusting them to the context of the elderly individual) showed that in the adapted version, the average values were lower in the majority of the attri-

butes, with the exception of “Accessibility” and “Longitudinality - available services”. The statistically different results of the scores from the PCATool-PEHC and the PCATool-PEquivalent indicated that the instruments did not observe the same information, even though, through the adaptation, they maintained some degree of complementarity. Considering that the adaptations are based on changes made by specialists from the areas of Gerontology and Geriatrics, with experience in PHC, it can be noted that in this sample of analyzed professionals, many attributes presented lower values in relation to the equivalent instrument. The judgment of the specialists ensures that these results are most likely due to the specific aspects referent to the elderly individual in the PHC, which were added to the PCATool-PEHC, and do not stem from a random effect associated with the increase in the number of items²⁷.

We can cite as a positive attribute of this work the adaptation based on a widely known instrument, which allows for the comparability of the results within the structures themselves (longitudinal follow-up of the PHC in services, communities, or cities), focusing on the rendering of services geared toward the elderly. This study and its characterization of care and services provided for the elderly population is the object of great demographic and epidemiological interest due to the increase in the number of users. The OPAS, in their document entitled, “Renovation of Primary Health Care in the Americas”²⁸, recognizes the PHC as one of the “most equal and effective ways to organize a health system”. The desire is to make it possible for the “universal access to services” and the “complete and integrated care over time”. The health of the elderly is considered to be one of the 24 priority sub-agendas for research in the “National Agenda of Priorities of Health Research”²⁹. In this sub-agenda of elderly health, it is important to highlight, in the line of research of the “Evaluation of Policies, Programs, Series, and Technologies”, the carrying out of studies that “evaluate the impact of health service care and use models, such as the ‘Family Health Strategy’ and the ‘Community Health Agents’”. It is also important to mention that this study runs in line with the principles of SUS and with the “National Policy on Science, Technology, and Innovation in Health in Brazil”.

As a negative aspect, the adaptation of the instrument also brings with it an increase in the number of evaluated items and, consequently, an increase in the application time. However, as has

been mentioned by some professionals who participated in the interviews, the inserted items also presented, *per se*, an instructive and formative character, which did not diminish the interest in the professionals' participation. Another negative criticism refers to the data having been collected in a single city, which represents a limitation in the potential to generalize the results of this study, since the sample considers only professionals of the family health teams in the city of Campinas-SP.

In the future, the application of this adapted instrument will enable the analysis of the reduction of items or the creation of a reduced version, based on elements of redundancy or of a low power of statistical differentiation. One aspect to be considered is that the maintenance of items can bring about advantages regardless of their statistical power when observed as regards the interest of the applied item in relation to the quality of the PHC.

Final considerations

Finally, with the analyses and obtained results, it is our understanding that the version of the instrument "PCATool-PEHC" contains an adequate validity of content and internal consistency. The results obtained point to the possibility of application in other regions to verify their functionality, reproducibility, and comparability, as it is an instrument adapted from the PCATool-Professionals for follow-up of PHC among elderly individuals. The exchange of results of evaluations conducted using this instrument will enable the measure of the attributes of the PHC by the FHS teams (healthcare professionals and local health managers), in an attempt to bring about improvements in the attributes that obtained low scores, as well as solidify the actions in the attributes that were well evaluated.

Collaborations

MA Guimarães was involved in the project in its conception and study design, data collection, analysis, data interpretation, writing the paper and critically reviewing the manuscript. A Fattori was involved in the project in its conception and study design, performed statistical analysis, contributed to the interpretation of data and critical review of the manuscript. AMV Coimbra was involved in the project in its conception, study design, contributed to the interpretation of data, writing of the work and critical review of the manuscript.

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Article submitted 07/10/2021

Approved 09/12/2021

Final version submitted 11/12/2021

Chief editors: Romeu Gomes, Antônio Augusto Moura da Silva



