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Primary Care Assessment Tool: regional differences based on the National Health Survey from Instituto Brasileiro de Geografia e Estatística

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Abstract *In 2019, unprecedentedly among the official statistical institutes worldwide, the IBGE included a particular module on evaluating primary health care in its central population-based population survey, the National Health Survey (PNS-2019). The survey considered the reduced version of the Primary Care Assessment Tool (PCAT), developed and disseminated by Starfield and Shi, to assess the existence and extent of the structure and process characteristics of PHC services. It is the most significant probabilistic sample using this instrument ever conducted in a single country in the world that interviewed users aged 18 or over (n=9,677). The results of the Brazilian overall PCAT scores (5.9 [5.8; 5.9]) point to significant regional and intraregional contrasts, with the South of the country standing out with the best evaluations of primary care services (overall score = 6.3 [6.2; 6.5]) and the North with the worse (overall score = 5,5 [5,3; 5,7]). There were also statistically significant and more favorable differences between residents of households registered by family health teams, among older adults, and those using health services the most (adults with reported morbidities).*

Key words *Primary health care, Health assessment, Household surveys, PCAT, Brazil*

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Introduction

In the 1990s, through more than a hundred studies prepared or reviewed at Johns Hopkins University in the United States, physician and professor Barbara Starfield systematized a definition of Primary Health Care (PHC), which started to be used internationally[1] and, since then, has been recognized by the World Association of Family Doctors[2] and the Johns Hopkins Bloomberg School of Public Health, which published open access to the leading conferences held throughout her research career[1].

Starfield[3] affirms that *primary care is that level of a health service system that offers a gateway to all new needs and problems, considering care for all conditions, except for very unusual or rare ones, and coordinating care*.

Based on this definition, the author conceptualized four essential functions or features for primary care actions and services: (i) accessibility and use of the health service as the first contact and source of care for each new problem or new episode of the same health problem, except for medical emergencies and urgencies; (ii) longitudinality: existence of a continued source of care and its use over time; (iii) comprehensiveness: establishment of a portfolio of available primary care services to offer comprehensive care, both of a biopsychosocial nature, and promotion, prevention, cure and rehabilitation actions; (iv) care coordination: which presupposes some form of care continuity by the same professional or through clinical records, or both, promoting the integration of services and global patient care.

Starfield[3] adds: *Primary care addresses the most common problems in the community, offering prevention, cure, and rehabilitation services to maximize health and well-being*.

Besides the essential components, Shi et al.[4] proposed three other functions, called "derivatives", which qualify PHC service actions: (i) people- and family-centered ((family orientation) health care; (ii) community orientation: recognition by the health service of the community needs through epidemiological data and direct contact, their relationship with it, and the joint planning and evaluation of services; (iii) cultural competence: adaptation of the provider (Health team and professionals) to the special cultural characteristics of the population to facilitate the relationship and communication with them. These authors believe that a service designed to meet the population's needs can be considered a primary care provider when it has the four essential features, increasing its power of interaction when it also has the derived features. When a health service is strongly oriented towards achieving the most significant presence of these features, it can provide comprehensive care. This definition of PHC can be one of the ways to guide the strategies for evaluating and investigating PHC services. Starfield proposed designing a set of questions in an instrument called the Primary Care Assessment Tool (PCAT) to measure these essential and derived features.

The thorough identification of the presence and extension of these features is essential to define a PHC-oriented service. Starfield[3] states we should identify whether such services are guided by their features when evaluating PHC since the presence and their better scores promote better health indicators, greater user satisfaction, lower costs, and more significant equity, and, consequently, affect the health condition of populations and people. Such statements have been corroborated by other authors[5].

Primary Care Assessment Tool use in Brazil and the world

Hundreds of studies have been carried out over the past twenty years on all continents since Starfield et al.[6], Cassady et al.[7,] and Shi et al.[4] published their original research presenting the Primary Care Assessment Tool (PCAT) instruments to evaluate PHC actions and services to the scientific community in the U.S., with validated versions adapted to the reality of each country. Africa was the last continent to use it (Bresick et al.[8]).

The pioneering researchers were led by Professors Barbara Starfield and Leiyu Shi of the Johns Hopkins Bloomberg School of Public Health. The American institution then started to disseminate several studies using this tool on its institutional website[1], thus serving as the primary digital repository for managers, researchers, and students. Since then, Starfield has influenced and supported several studies in North America and Latin America[9,10] and, to a lesser extent, Europe. Recently, Shi has been developing several studies using the instrument in Asian countries with local researchers[11-16].

In Brazil, a team of researchers from the Federal University of Rio Grande do Sul (UFRGS), coordinated by Professor Erno Harzheim and with the help of Professor Barbara Starfield[17], validated the official version of the instrument for child users (0-12 years) in 2006, using the same Likert scale as the original instrument, namely:

"*certainly yes*", "*probably yes*", "*probably not*" and "*certainly not*". Subsequently, this team supported the Ministry of Health in preparing the PHC Evaluation Manual using the PCATool[18].

In 2020, the Primary Health Care Secretariat (SAPS)/Ministry of Health published a Manual[19] with an updated version of the instruments that underpin the so-called "PCATool family", incorporating unpublished versions; timely updating the wording of some items. As a result, the abridged versions of the questionnaire, both for adult users and children, were included in the list of questionnaires, besides the versions for "adult user" and "health professional" for oral health. Each original version was transformed into an applicable tool by interviewers to adapt them to the Brazilian reality. They were translated, debriefed, adjusted, and validated, characterized by applying statistical methods to make the instrument's validity and reliability measures known.

This institutionalization of a methodology for evaluating primary health care services by the Brazilian Ministry of Health was followed by a very relevant one. In 2019, the Brazilian Institute of Geography and Statistics (IBGE), with technical and financial support from the Ministry of Health's Secretariat of Primary Health Care (SAPS/MS), replaced the old PNS-2013 module and included the short version of PCATool[20] for adult users.

This paper primarily aims to compare the results obtained by IBGE in the evaluation of adult users of PHC services between the regions of the country in the Unified Health System (SUS).

Material and methods

The PNS 2019/IBGE is the largest Brazilian population-based household survey in health carried out with a conglomerate probabilistic sampling plan. It has multi-purposes and investigates, in its modules, several health care domains in the country. A total of 9,677 adults or 88,531 adults aged 18 years eligible to respond to Module H (PHC-specific and which used PCAT's abridged version) responded to the PHC assessment instrument (PCATool-Brasil) (Figure 1 and Table 1). We chose to present the estimates together with the respective 95% confidence intervals, with a significance level of 5%.

PCAT eligibility criteria in the PNS-2019

In the PNS-2019, the initial questions "H1", "H2", "H4" contain the eligibility criteria for starting responses to the instrument itself. They are: "*H1. When was the last time you saw a doctor?*" (only those who had an appointment less than six months ago follow on); "*H2. Was this your first appointment with this doctor?*" (only those replying "*no*" continue to answer); "*H4. Where did you seek medical care for this reason?*" (only those responding "*1. PHC unit (health post or center or family health unit*" continue to answer).

Thus, only those who somehow have any link with a PHC unit in the SUS, that is, people who have visited the same doctor more than

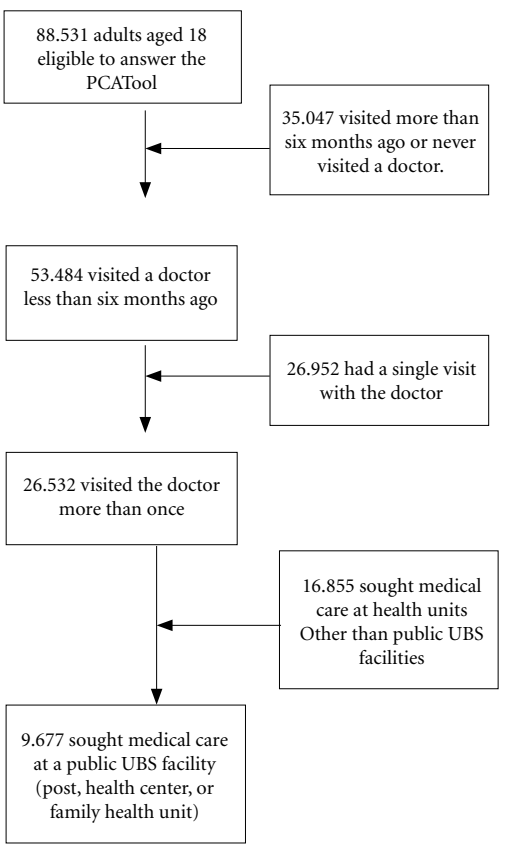

Figure 1. Flowchart with the sample of adults aged 18 years or older who answered the PCAT questionnaire ("Module H") - National Health Survey (PNS), Brazil, 2019.

Source: IBGE, Directorate of Research, Work and Income Coordination, National Health Survey (PNS), 2019.

Table 1. Distribution of the sample realized and the expanded population in Module H of the National Health Survey Brazil, Great Regions, Federation Units, Capitals - 2019.

Federation Units (UF) and Great Regions	UF Total		Capitals	
	Sample realized (*)	Expanded population	Sample realized (*)	Expanded population
Rondônia	164	94,819	78	28,620
Acre	196	51,674	91	21,350
Amazonas	339	274,781	152	139,724
Roraima	194	29,542	104	19,289
Pará	322	506,264	75	90,898
Amapá	93	36,249	51	20,306
Tocantins	278	178,894	50	20,347
North Region	**1,586**	**1,172,221**	**601**	**340,534**
Maranhão	392	373,547	50	46,895
Piauí	372	356,681	115	81,762
Ceará	515	722,079	54	103,695
Rio Grande do Norte	409	367,094	89	56,235
Paraíba	388	350,981	142	72,573
Pernambuco	424	700,061	115	142,982
Alagoas	427	338,587	139	82,328
Sergipe	296	196,994	87	43,084
Bahia	420	1,463,675	71	121,724
Northeast Region	**3,643**	**4,869,701**	**862**	**751,278**
Minas Gerais	638	2,036,536	189	237,559
Espírito Santo	364	308,008	129	38,183
Rio de Janeiro	331	818,908	79	196,022
São Paulo	727	3,933,558	309	1,097,418
Southeast Region	**2,060**	**7,097,010**	**706**	**1,569,182**
Paraná	535	1,116,811	112	166,419
Santa Catarina	513	815,700	69	33,995
Rio Grande do Sul	460	1,128,737	78	88,217
South Region	**1,508**	**3,061,248**	**259**	**288,631**
Mato Grosso do Sul	272	214,242	100	51,786
Mato Grosso	231	290,933	61	25,816
Goiás	222	408,039	58	65,458
Distrito Federal	155	147,161	155	147,161
Midwest Region	**880**	**1,060,375**	**374**	**290,221**
Brazil	**9,677**	**17,260,556**	**2,802**	**3,239,846**

(*) The sample realized in Module H corresponds to people aged 18 or over selected in each household, meeting the following response filters: 1-medical visit in the last six months (H1≤3), 2-at least two visits with the same doctor (H2 = 2), sought medical care at a PHC unit (health post or center or family health unit) (H4=1).

Source: IBGE, Directorate of Research, Work and Income Coordination, National Health Survey (PNS), 2019.

once six months before the interview date, will answer and evaluate the services. As a result of the eligibility questions, the IBGE survey opted to consider only people who accessed primary care services in the SUS. However, over the last decade, supplementary health in Brazil has also attempted to implement health care models from the PHC attribute, considering multidisciplinary health care teams in the work process.

What does the overall PCAT score measure?

Module H of PNS-2019 includes the short version of the PHC assessment instrument for

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adult users adapted from the versions published by the Ministry of Health[18,19]. The answers to each question on the Likert scale (values = 1 to 4) are transformed into scores from 0 to 10. Scores indicate the greater or lesser presence and extent of the features in the service under evaluation, which can be classified as "high" when greater than or equal to 6.6 and "low" if less than 6.6; that is, the minimum desirable standard for each attribute (in the full version of the instrument) or the set of features (in the short version of the questionnaire) must be equal to or higher than a score of 6.6. It is noteworthy that, according to the methods in the short version, calculating the overall PCAT score is allowed exclusively.

Analysis plan

This paper selected a set of variables available in the PNS 2019 that allows regional and local overall PCAT scores (score from 0 to 10) by (1) gender, (2) age group, (3) ethnicity/skin color, (4) per capita household income ranges, (5) marital status, (6) selected comorbidities (hypertension, diabetes, heart disease, asthma, depression, and chronic lung disease). It is also possible to compare the overall scores, stratifying the households registered vs. non-registered by the Family Health teams; and those who received x did not receive home visits by community health workers (ACS) or endemic workers (ACE) in the last 12 months.

Results

We opted to divide the presentation of the results into two parts. In the first, the profile of the eligible adult population that responds to Module H of the PNS-2019 is outlined. In the second, the results of the overall PCAT method scores are analyzed.

Profile of adults who regularly use PHC services in the SUS

The study had a sample of 9,677 participants representing an expanded population of 17,260,556 adults. All capitals were included, and the final sample is representative of all regions of the country. Of this total of adults who accessed the services regularly, 41.1% did so in the Southeast Region; 28.2% in the Northeast; 17.7% in the South; 6.8% in the North; and 6.1% in the Midwest. Women represented about 70%, and the age distribution among three groups suggests homogeneity: 18-39 years (32.6%), 40-59 years (35.8%), and 60 years or more (31.6%). However, age differences were identified between the regions, and the North had the highest participation of people aged 18-39 years (46.5%), and the South and Southeast had more older adults (35.9% and 35.4%, respectively).

Regarding self-declared ethnicity/skin color, 60.9% of people said they were brown or black, and 38.0% said they were white. Concerning self-declared brown/black people, 85.9% lived in the North, 79.7% in the Northeast, 56.3% in the Southeast, 29.7% in the South, and 67.9% in the Midwest. This was the variable of the sociodemographic profile with the most evident differences between the regions of the country.

The payment for a health plan in this subpopulation of people who responded to Module H is much lower than that observed in the resident population in general. Only 5.6% declared having a private health insurance plan in the former, while 28.5% was identified in the latter.

From the viewpoint of the labor market among people who regularly access PHC services, 46.2% are employed people, that is, people who in the reference week of data collection in the PNS 2019 worked at least one hour in paid activity, even if temporarily removed that week. Regarding the per capita household income range, the estimates indicate the significant dependence of adults with lower income on the use of PHC in Brazil, that is, 64.7% receive up to one minimum wage, 32.3% more than one up to three minimum wages, and only 3.0% receive more than three minimum wages. Regarding the morbidity profile, 39.2% reported having already had a medical diagnosis of systemic arterial hypertension, 15.9% diabetes mellitus, 15.3% depression, 7.8% heart disease, and 5.9% asthma (Table 2).

Estimated overall PCAT scores

The result of the overall PCAT score in Brazil was 5.9 [5.8; 5.9]. The results point out significant contrasts regionally and intra-regionally. The southern region of the country stands out as the one with the best evaluations of PHC services (overall score = 6.3 [6.2; 6.5]), and on the other side, the northern region scores the worst (overall score = 5.5 [5.3; 5.7]) (Figure 2).

When the sociodemographic, economic and reported morbidity variables are compared, the outlook by the PNS-2019 for the PCAT over-

all score points out similarities and differences. There is no statistically significant difference between the scores of men (5.9) and women (5.8); white (5.9) or brown/black adults (5.9), having/not having a spouse (5.9); having/not having health insurance (5.9); employed (5.8) and not employed (5.9) in the labor market.

Concerning the age group, the older the person, the better the assessment of PHC services. In other words, the score was 5.6 for the 18-39 years group, 5.9 for 40-59 years, and 6.1 for the older adults aged 60 or over. Regarding per capita household income, the intermediate range (more than one minimum wage to three minimum wages) showed a higher estimate (6.0) when compared to the others (5.8). Finally, concerning the referred morbidity, people with a medical diagnosis of systemic arterial hypertension, diabetes mellitus, depression, and heart disease evaluated the services more positively than those with none of such morbidities (Table 2).

When observing the overall PCAT scores, stratifying the registered vs. non-registered households by the Family Health Teams, the former were evaluated better. Yet, the results point out statistically significant differences between those monitored by the Family Health teams and received home visits from an ACS or a team member (6.1 [6.0-6.2]) and those who did not receive visits (5.7 [5.5-5.8]). A similar behavior occurs when comparing those that endemic workers visited at home: the scores were also higher (6.0 [5.9-6.1]) when observing those that were not seen (5.6 [5.4 - 5.7]). (Figures 3)

Finally, the PNS-2019 compares the percentage of Brazilian households registered by the eSF

Table 2. Sociodemographic profile, aspects of the labor market, and general PCAT score for adults aged 18 and over who used some primary health care service in the last six months before the interview date. Brazil, 2019 (N=17,260,557).

Characteristics	Total (PCAT sample)	% column	(%) Lower Limit CI	(%) Upper Limit CI	General PCAT Score	CI
Geographical region*						
North	1,172,221	6.8%	[6.5%;	7.1%]	5.5	[5.3; 5.7]
Northeast	4,869,701	28.2%	[27.7%;	28.7%]	5.8	[5.6; 5.9]
Southeast	7,097,010	41.1%	[39.6%;	42.5%]	5.8	[5.7; 6.0]
South	3,061,248	17.7%	[17.0%;	18.4%]	6.3	[6.2; 6.5]
Midwest	1,060,375	6.1%	[5.7%;	6.5%]	5.8	[5.6; 6.0]
Gender						
Male	5,203,907	30.1%	[29.3%;	30.9%]	5.9	[5.8; 6.0]
Female	12,056,650	69.9%	[69.5%;	70.1%]	5.8	[5.8; 5.9]
Age group*						
18-39 years	5,627,197	32.6%	[31.7%;	33.5%]	5.6	[5.5; 5.8]
40-59 years	6,176,806	35.8%	[35.0%;	36.5%]	5.9	[5.7; 6.0]
60 years or over	5,456,554	31.6%	[30.8%;	32.4%]	6.1	[6.0; 6.2]
Ethnicity/skin color						
White	6,554,888	38.0%	[36.9%;	38.9%]	5.9	[5.7; 6.0]
Black/brown	10,514,155	60.9%	[60.4%;	61.4%]	5.9	[5.8; 6.0]
Marital status						
With spouse	11,221,591	65.0%	[64.6%;	65.4%]	5.9	[5.8; 6.0]
Without spouse	6,038,966	35.0%	[34.1%;	35.8%]	5.9	[5.8; 6.0]
Has health plan?						
Yes	968,387	5.6%	[4.8%;	6.4%]	5.9	[5.5; 6.2]
No	16,292,169	94.4%	[94.3%;	94.5%]	5.9	[5.8; 5.9]
Occupation						
Employed	7,969,308	46.2%	[45.5%;	46.8%]	5.8	[5.7; 5.9]

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Table 2. Sociodemographic profile, aspects of the labor market, and general PCAT score for adults aged 18 and over who used some primary health care service in the last six months before the interview date. Brazil, 2019 (N=17,260,557).

Characteristics	Total (PCAT sample)	% column	(%) Lower Limit CI	(%) Upper Limit CI	General PCAT Score	CI
Unemployed	9,291,248	53.8%	[53.1%;	54.5%]	5.9	[5.8; 6.0]
Per capita household income ranges*						
Up to one minimum wage	11,172,146	64.7%	[64.2%;	65.3%]	5.8	[5.7; 5.9]
More than one and less than three minimum wages	5,578,185	32.3%	[31.3%;	33.2%]	6.0	[5.9; 6.2]
More than three minimum wages	510,225	3.0%	[2.5%	3.4%]	5.8	[5.4; 6.2]
Reported morbidity						
Systemic arterial hypertension *						
Yes	6,765,463	39.2%	[38.4%;	40.0%]	6.2	[6.1; 6.3]
No	10,495,093	60.8%	[60.2%;	61.4%]	5.7	[5.6; 5.8]
Diabetes mellitus*						
Yes	2,742,081	15.9%	[15.0%;	16.7%]	6.3	[6.1; 6.4]
No	14,518,475	84.1%	[83.9%;	84.3%]	5.8	[5.7; 5.9]
Depression*						
Yes	2,647,281	15.3%	[14.3%;	16.3%]	6.1	[5.9; 6.2]
No	14,613,276	84.7%	[84.4%;	84.9%]	5.8	[5.8; 5.9]
Heart disease*						
Yes	1,359,166	7.9%	[7.2%;	8.5%]	6.4	[6.1; 6.6]
No	15,901,390	92.1%	[92.1%;	92.2%]	5.8	[5.7; 5.9
Asthma						
Yes	1,010,602	5.9%	[5.0%;	6.6%]	6.0	[5.7; 6.3]
No	16,249,954	94.1%	[94.0%;	94.3%]	5.9	[5.8; 5.9]

Note 1: The table considers the following subpopulation: adults 18 years of age or over who sought a UBS (post, health center, or family health unit) in the last six months for a medical visit, and this was at least a second visit with the same doctor. This is the concept used in Module H of the PNS-2019, which defines the eligibility criteria for the response to that Module, which contains the nationally and internationally validated instrument called "Primary Care Assessment Tool" (PCAT).
Note 2: Scores range from 0 to 10. A score ≥ 6.6 is considered by the methodology of the PCAT instrument as a minimum quality value to assess primary care services from the adult user's perspective.
Note 3: The morbidity referred to in the PNS-2019 considered the answer to the question, "has any doctor already given you the diagnosis of ..."
(*) Variables with statistically significant differences at the 0.05 level.

Source: IBGE, Directorate of Research, Coordination of Work and Income, National Health Survey (PNS), 2019.

between the federation units with the performance obtained in the PCAT overall score. One questions whether higher PHC population coverage by the ESF (independent variable) can also lead to a higher overall score (dependent variable). The results reveal the existence of two distinct UF groups, separated by the regression line in which the eSF population home coverage was considered "fixed" (Figure 4). Three states stand out outside this trend with total scores above 6.3: Rio Grande do Sul, Santa Catarina, and Mato Grosso.

Discussion

To the best of the authors' knowledge, among the official statistical institutes worldwide, IBGE has carried out the most extensive PCAT use evaluation in history, based on random samples by home-based conglomerates in all of the country's federation units. By so doing, it opened what can be considered as "baseline studies" for the evaluation of PHC services from the perspective of adult users with robust and internationally comparable scientific methodology.

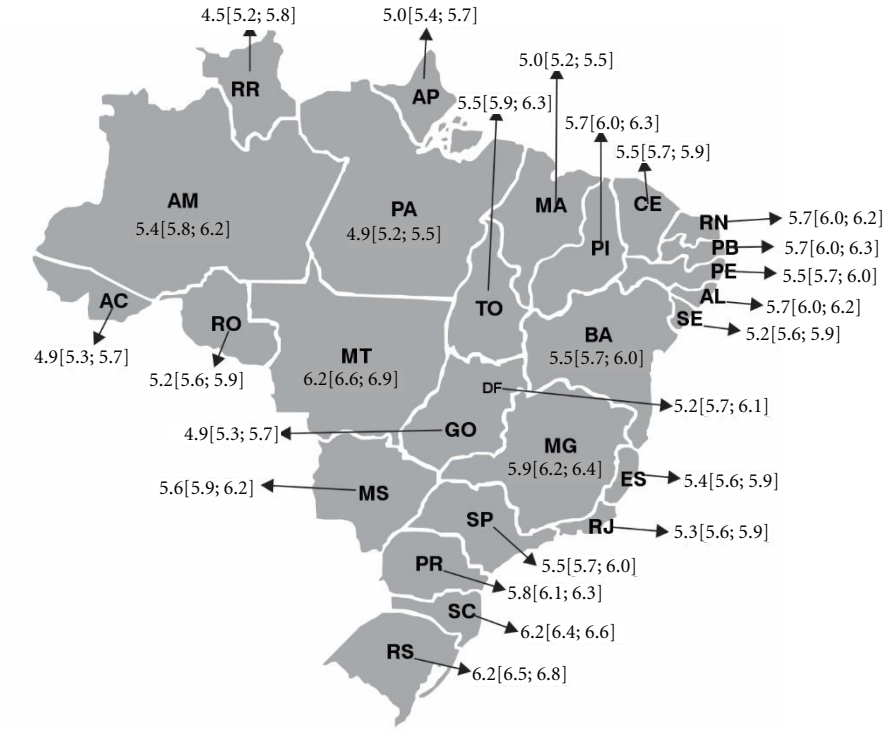


Figure 2. PCAT general scores. Brazil, 2019.

Note 1: The overall PCAT score for Brazil was 5.9 [5.8; 5.9]; North Region 5.5 [5.3; 5.7]; Northeast Region 5.8 [5.6; 5.9]; Southeast Region 5.8 [5.7; 6.0]; South Region 6.3 [6.2; 6.5]; Midwest Region 5.8 [5.6; 6.0].
Note 2: Scores range from 0 to 10. A score ≥ 6.6 is considered by the methodology of the PCAT instrument as a minimum quality value to assess primary care services from the adult user's perspective.

Source: IBGE, Directorate of Research, Work and Income Coordination, National Health Survey (PNS), 2019

Noteworthy are the absolute values of the scores obtained in each State and Brazil as a whole. An insufficient number of scores and significant regional differences are observed, showing the need to better qualify Brazilian PHC in the Brazilian Unified Health System (SUS). The fact that the Family Health teams score higher than the traditional PHC Units shows the Brazilian success in focusing on the ESF to qualify PHC. However, the health situation, the introduction of new information and care technologies, and the changes in the financing of Brazilian PHC carried out in 2019[21] demand greater emphasis on access, quality, and value in health[22] the three management levels to offer the most vulnerable part of the Brazilian population services with a more significant presence of PHC features. The data presented show that PHC in the SUS has fulfilled its role of including the most vulnerable in the health system, but it still needs to develop more strongly the features and characteristics that strengthen it to fulfill its objective of improving health and quality of life of the population.

The PCAT is an instrument at the service of PHC used in various locations in different countries, with psychometric properties evaluated. This gives the PCAT an advantageous feature of international comparability[23]. No studies with such a wide range have been published in the scientific literature searched by the authors so far that can subsidize comparisons or temporal analyses. In Catalonia, Spain, a population-based study with similar statistical methodology was proposed in a version called the "super short" instrument, entitled "PCAT-A10"[24] for people over 14.

Using the instrument to monitor PHC services, the PCAT has been employed by a group of Canadian researchers from the University of

Table 3. Distribution of the eligible adult population aged 18 years or over who used any primary health care service in the last six months before the date of the interview, general PCAT scores according to selected characteristics - Brazil and Great Regions, 2019.

Sociodemographic characteristics and morbidity	Description	Brazil		North		Northeast		Southeast		Sul		Midwest	
		(%)	Score PCAT (CI)	(%)	Score PCAT (CI)	(%)	Score PCAT (CI)	(%)	Score PCAT (CI)	(%)	Score PCAT (CI)	(%)	Score PCAT (CI)
Gender	Male	30.15	5.92 [5.80-6.04]	29.61	5.58 [5.33-5.83]	27.48	5.91 [5.70-6.11]	30.41	5.80 [5.57-6.02]	33.91	6.36 [6.14-6.59]	30.42	5.73 [5.39-6.07]
	Female	69.85	5.84 [5.76-5.93]	70.39	5.45 [5.24-5.66]	72.52	5.7 [5.58-5.82]	69.59	5.84 [5.67-6.01]	66.09	6.28 [6.10-6.46]	69.58	5.84 [5.61-6.07]
Age group	Up to 39 years	32.60	5.62 [5.50-5.75]	46.53	5.24 [4.99-5.50]	37.83	5.49 [5.32-5.67]	28.69	5.71 [5.44-5.97]	26.93	5.97 [5.68-6.27]	35.77	5.61 [5.31-5.91]
	40-59 years	35.79	5.86 [5.73-5.99]	31.60	5.50 [5.26-5.73]	35.77	5.80 [5.64-5.96]	35.87	5.77 [5.49-6.04]	37.15	6.27 [6.06-6.48]	35.95	5.97 [5.62-6.32]
	60 years or over	31.61	6.12 [6.01-6.23]	21.87	5.99 [5.75-6.23]	26.40	6.07 [5.87-6.27]	35.44	5.99 [5.78-6.19]	35.92	6.6 [6.41-6.78]	28.28	5.85 [5.53-6.17]
Ethnicity/skin color	White	37.98	5.87 [5.75-5.99]	12.82	5.31 [4.76-5.86]	19.05	5.94 [5.69-6.18]	42.66	5.57 [5.36-5.77]	69.31	6.32 [6.14-6.51]	30.86	5.78 [5.43-6.14]
	Black/brown	60.91	5.86 [5.77-5.95]	85.88	5.51 [5.34-5.68]	79.66	5.7 [5.59-5.82]	56.33	6.01 [5.82-6.21]	29.72	6.25 [6.03-6.47]	67.93	5.82 [5.59-6.06]
Marital status	with spouse	65.01	5.86 [5.77-5.96]	68.09	5.42 [5.23-5.61]	65.68	5.73 [5.60-5.85]	62.21	5.86 [5.67-6.05]	70.70	6.26 [6.08-6.44]	60.95	5.83 [5.58-6.08]
Occupation	unemployed (*)	53.83	5.91 [5.81-6.00]	53.26	5.46 [5.23-5.69]	58.84	5.74 [5.60-5.87]	51.73	5.89 [5.7-6.08]	52.94	6.38 [6.19-6.57]	48.08	5.97 [5.71-6.23]
Per capita household income range	Up to one MW (**)	64.73	5.8 [5.71-5.88]	81.72	5.45 [5.26-5.63]	86.36	5.73 [5.61-5.85]	54.53	5.81 [5.62-6.00]	49.02	6.18 [5.98-6.39]	60.28	5.73 [5.49-5.97]
With health plan	No	94.39	5.86 [5.79-5.94]	97.14	5.49 [5.32-5.66]	97.73	5.73 [5.62-5.84]	92.85	5.85 [5.7-6.00]	91.01	6.3 [6.16-6.45]	96.08	5.81 [5.60-6.01]
Arterial Hypertension	Yes	39.20	6.19 [6.08-6.29]	27.88	5.99 [5.76-6.22]	36.47	6.17 [6.00-6.34]	43.15	6.02 [5.84-6.21]	38.61	6.66 [6.45-6.88]	39.41	6.24 [5.90-6.57]
Diabetes	Yes	15.89	6.25 [6.08-6.43]	12.51	5.97 [5.62-6.33]	14.18	6.22 [5.91-6.52]	17.84	6.21 [5.91-6.52]	15.61	6.62 [6.31-6.93]	15.23	5.9 [5.42-6.38]

it continues

Table 3. Distribution of the eligible adult population aged 18 years or over who used any primary health care service in the last six months before the date of the interview, general PCAT scores according to selected characteristics - Brazil and Great Regions, 2019.

Sociodemographic characteristics and morbidity	Description	Brazil		North		Northeast		Southeast		Sul		Midwest	
		(%)	Score PCAT (CI)	(%)	Score PCAT (CI)	(%)	Score PCAT (CI)	(%)	Score PCAT (CI)	(%)	Score PCAT (CI)	(%)	Score PCAT (CI)
Heart disease	Yes	7.87	6.35 [6.11-6.60]	4.64	5.75 [5.21-6.28]	4.95	6.37 [5.74-7.00]	9.28	6.33 [5.94-6.73]	10.59	6.55 [6.16-6.94]	7.62	6.09 [5.57-6.60]
Asthma	Yes	5.85	5.99 [5.72-6.26]	5.20	5.55 [4.99-6.11]	3.57	5.78 [5.33-6.23]	6.75	6.03 [5.57-6.49]	7.77	6.25 [5.71-6.80]	5.56	5.62 [5.06-6.18]
Depression	Yes	15.34	6.05 [5.86-6.24]	7.15	5.76 [5.32-6.2]	9.87	5.79 [5.47-6.12]	17.25	5.89 [5.55-6.23]	22.67	6.59 [6.34-6.84]	15.53	5.82 [5.31-6.34]

Captions: CI = 95% confidence interval for the estimated overall scores of the Primary Care Assessment Tool (PCAT).
(*) The unemployed population consists of people who do not have a job but are willing to work and who, for this reason, take some effective action (talking to people and searching in newspapers and other media) (**) MW = Minimum Wage.

Source: IBGE, Directorate of Research, Coordination of Work and Income, National Health Survey (PNS), 2019.

Alberta who published a study of repeated panels accompanying adults in the same health services over ten years in the city of Alberta[25].

Brazil was one of the first countries to adapt and evaluate the psychometric properties of PCAT in the world, right after the U.S. (country of origin of the instrument) and Canada. Brazilian studies using the PCAT point to the high heterogeneity of services, a general score with values ranging from 3.66 in Ilhéus to 7.01 in Rio de Janeiro. The same can be observed regarding the essential scores, high amplitude values that ranged from 3.86, in Ilhéus, Bahia, to 7.37 in Rio de Janeiro[23]. Among Brazilian capitals, previous studies using the PCATool in Brazil found results close to those in the PNS 2019: Belo Horizonte 2014 (Essential score: 5.88, overall score: 5.94); Curitiba 2013 (Essential score: 5.75, overall score: 5.12); Rio de Janeiro 2015 (Essential score: 5.93, overall score: 5.73); Porto Alegre 2013 (Essential score: 5.41, overall score: 5.22), Florianópolis 2012 (Essential score: 6.6, overall score: 6.4)[9,26-29].

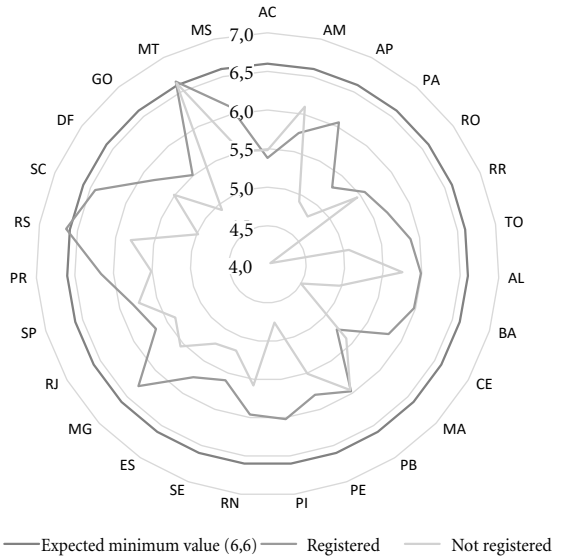
The result of the overall PCAT score in Brazil (5.8; 5.9) was lower than that found in international studies such as in Montevideo (7.51/6.93), Seoul and the metropolitan region (7.63/7.45), Santander Department in Colombia (7.84/6.99), Shigatse and Linzi in Tibet (7.36/7.41), Columbia in the U.S. (6.99/6.63), and South Africa 6.62[8,12,30-31].

One outstanding aspect in our results is the overall PCAT score below the standards of excellence (cut-off point: ≥ 6.6) in all regions of the country. This reflects the heterogeneity of PHC services, especially the ESF, which despite having driven an improvement in several indicators over the past decades, with an undeniable contribution in maternal and child health, still needs to advance in the quality of care for chronic diseases, given the rapid demographic transition. Achieving these results requires changes in the financing format of the PHC/ESF teams, greater leadership of telehealth in coordinating care and access of people to services, and clear and measurable indicators, with periodic evaluation of managers at the three federative levels[32].

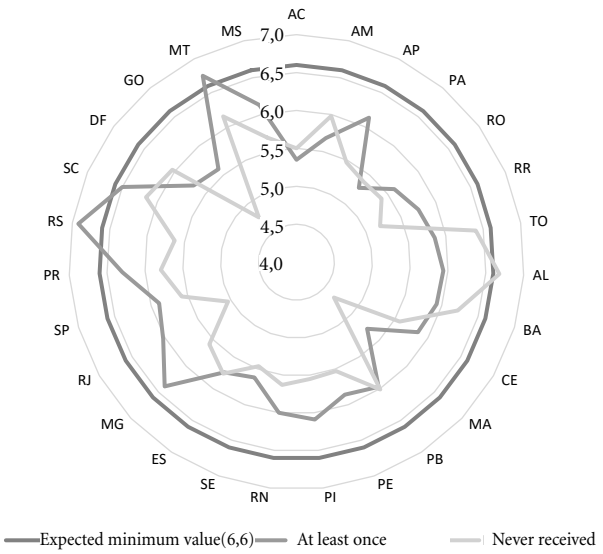
Study limitations

If we consider the classic triad of health assessment ("structure-processes-results assessment"), the PCAT measures the features in the structure and process dimensions. However, this triad can be used in a comparative quantitative perspective. The empirical identification of PHC

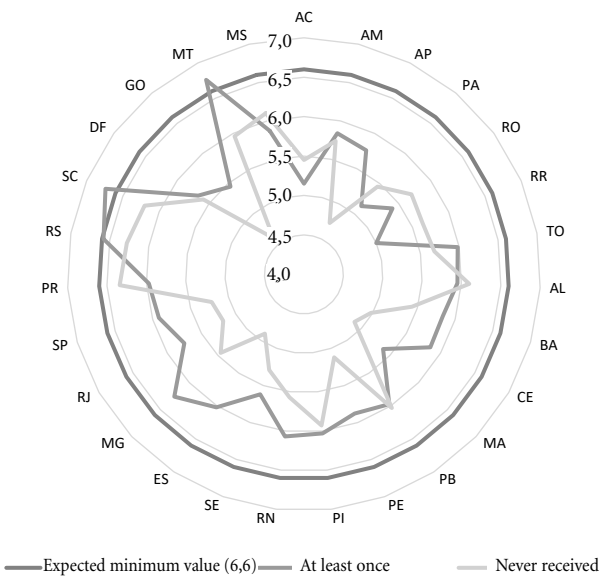
3A. Registered vs. not registered in the Family Health Strategy



3B. Frequency with which homes received a visit from the ACS or family health team member.



3C. Frequency with which homes received a visit from an endemic worker.



Figures 3. General PCAT scores by occupation condition, registration in the Family Health Strategy, and home visit frequency. Brazil, Federation Units, 2019.

Source: Own elaboration, based on microdata from IBGE, Directorate of Research, Coordination of Work and Income, National Health Survey (PNS), 2019.

features allows verifying the association between these indicators and outcome indicators – the effectiveness – of care on the population's health.

In parallel with higher coverage of primary care services in Brazil through the Family Health Strategy (ESF) is the national and international

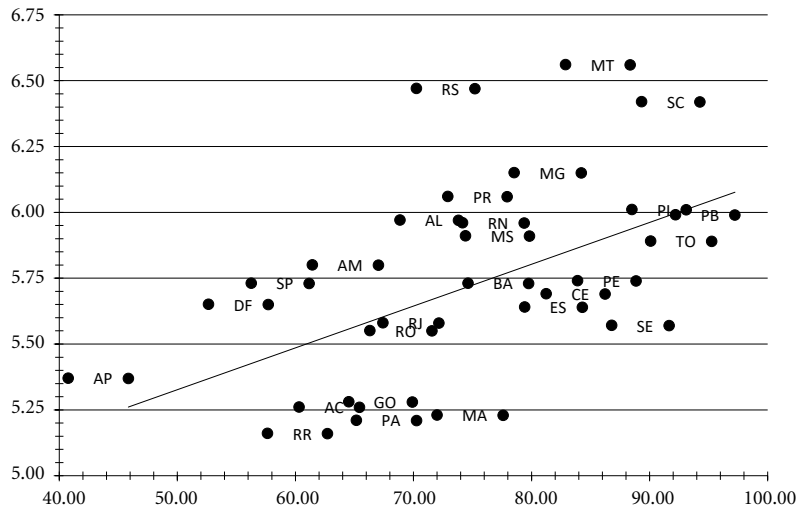


Figure 4. Relationship between the proportion of households registered by the Family Health Teams (eSF) and the overall score of PCAT Brasil – Federation Units, 2019.

Source: Own elaboration, based on microdata from IBGE, Directorate of Research, Coordination of Work and Income, National Health Survey (PNS), 2019.

evidence of a growing association between better health outcomes and more significant presence and extension of these features.

One of the limitations of the PNS 2019 refers to the sample size for the estimates of the capitals of the country. In the case of module H, a possible adaptation would be to extend the reference time for one of the eligibility questions, asking the resident about a "medical visit in the last 12 months" instead of the last six months.

Recommendations

The authors of this article suggest recommendations for the National Health Survey. The first is regarding the size of the PNS questionnaire. The selection of questions that make up a research instrument results from the intense debate between IBGE and researchers in public health. This exchange between managers and scholars generates a possible and feasible questionnaire to be applied on a home basis. However, over the decades, since the first special health supplement in the then PNAD 1998, we observe that the time has come for a general review of the PNS, removing questions that produce estimates with high coefficients of variation and that, therefore, can only be released for the country's total. This can open space to complement the measurement and evaluation of Brazilian PHC, which, as noted, has a structuring role in the public health of each country and even more so in pandemic times. We should recall that immunization actions are developed in universal health systems at this level of health care. Thus, we propose that one of the factors restricting the results of the PNS 2019 for PHC can be solved.

It refers to the use of the short version of the PCAT that allows only the calculation of the overall score of the instrument; that is, following the recommended methodology, it is not possible to obtain the specific scores for each of the essential features and derivatives recommended by Starfield and Shi (fundamental for having a Brazilian PHC baseline). Thinking of the role of the greatest external evaluator of Brazilian public health policies, the IBGE could, therefore, incorporate in the next edition of the PNS the full version of the adult user of the PCAT in Module H, changing it to "Primary Health Care Features".

The second recommendation is expanding the scope of Module H, starting to consider "private practices, private clinics or outpatient

clinics in private hospitals" as one of the possible responses in this Module. After all, in the last decade, supplementary health began to implement health care models gradually based on the assumptions of family and community medicine, working in multiprofessional teams, developing home visits, and the territorial patient list management strategy.

Finally, the last recommendation is that the Ministry of Health create a permanent work program with IBGE to ensure the continuing financing of the PNS and other home-based surveys of interest to health, although data collection may be carried out remotely, such as the PNAD COVID-19.

We emphasize the urgent need to have municipal population estimates by gender and age group annually so that health surveillance actions can consider the appropriate denominators in calculating their epidemiological indicators. Recently, an IBGE-Ministry of Health partnership developed an initiative in this regard[33].

Final considerations

In 2019, the Ministry of Health strengthened PHC and revived IBGE's institutional role, developing specific technical cooperation to establish a baseline for evaluating PHC services, with a solid, internationally validated methodology, which compares with statistical rigor the Brazilian local realities, in developing the primary public policy of the SUS.

Leaving aside a PMAQ that in its research aspect with a quantitative approach – in the evaluation of users – did not have statistical representativeness because it considered samples of respondent volunteers ("sample of collaborators"), the Ministry of Health innovated in mid-2019 by treading the most challenging path agreed with the IBGE. It adapted one of the PNS modules, bringing PHC as one of its Modules, based on an instrument that, in 2010, the Ministry of Health recommended for the assessment of PHC services.

On the one hand, it was a more arduous path. On the other, it brought us the statistical gold standard for population-based surveys that aim to outline a national, regional, and state baseline for one of the facets of health assessment: user perspective. The use of probabilistic sampling methods and techniques are recommended by statistical institutes around the world, among other reasons, for estimating the sampling errors in any study of this nature and for their strength in their external validity (statistically-wise), which is the ability to generalize the sample results to the study population.

The results showed that the Brazilian governments over the last decades were right to maintain and perfect the PHC model, based on the Family Health Strategy and that the capillarity of their actions and interventions has reached and is recognized all over Brazil by the people registered and monitored in this strategy and people with several chronic morbidities who use SUS services the most. IBGE's revival as the most prominent external evaluator of Brazilian health actions constructed a baseline for evaluating users of PHC services in each federation unit with rigor and statistical representativeness.

Collaborations

LF Pinto prepared the structure and the initial text of the paper and approved the final version. All other authors contributed to the writing and review of the paper.

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