Work Process of Primary Health care Teams in Brazil from Rural/Urban Municipal Typology: A National Evaluation Study

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Research Article

Keywords: Primary Health Care, Health Evaluation, Unified Health System.

Posted Date: July 15th, 2021

DOI: <https://doi.org/10.21203/rs.3.rs-708593/v1>

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Abstract

Background: In Brazil, primary health care assumes the challenge of organizing and articulating health care networks, based on the performance of multidisciplinary teams linked to basic health units. Given that there are limited studies on the organization of the work process of primary health care teams in Brazilian municipalities that consider the rural-urban typology proposed by the Brazilian Institute of Geography and Statistics, this study aims to analyze the work process of primary health care teams in Brazilian municipalities.

Methods: Quantitative evaluation was conducted using secondary data from the third cycle of the National Program for Improving Access and Quality of Primary Care (PMAQ-AB) and the Rural/Urban Classification of the Brazilian Institute of Geography and Statistics. Overall, 37,350 teams that participated in all levels of the PMAQ-AB external evaluation were included. The descriptive analysis considered three axes: 1) territorialization, 2) action planning, and 3) monitoring and self-evaluation. Multiple correspondence analyses were used to verify the relationships between the variables and municipal classifications.

Results: Teams from adjacent rural municipalities had the lowest percentage of uncovered population in the territory (21.0%), while those from urban municipalities had the highest percentage with reference population >3,500 people/team (43.0%). It was found that 5,446 (15.1%) teams did not carry out planning, and the highest percentage of teams that executed planning was in the urban strata (85.7%). Monitoring performance was observed in 87.9% of the teams, with approximation of the values among the municipal strata with similar characteristics of location; self-evaluation showed the highest percentage in the adjacent intermediate stratum (90.4%). It was possible to identify three groups of teams with distinct characteristics of territorialization and two groups in relation to planning, monitoring, and self-evaluation.

Conclusion: The results suggest important differences in the work process of primary health care teams, which vary according to the characteristics of the municipalities in which they are located.

Introduction

Models for organizing access to health systems and services have been widely debated on global platforms, given increasing costs in the sector, population aging, and epidemiological transition [1].

At a recent United Nations high-level meeting on Universal Health Coverage – a goal of the Sustainable Development Goals (SDGs) – a resolution was passed emphasizing the need for countries to ensure sufficient public funding to strengthen the health system; maximize the efficiency of health spending to deliver accessible, timely, and quality services; and increase resource allocation for Primary Health Care (PHC), a pillar for achieving health-related SDGs [2].

In Brazil, PHCs assume the challenge of organizing and articulating healthcare networks, based on the performance of multidisciplinary teams linked to Basic Health Units (BHUs). Each BHU has a sanitary responsibility over a population attached to a defined territory, contemplating issues related to the social determinants of the health/disease process, intersectoral action, and the inclusion of representative social participation [3, 4].

From the perspective of municipalities' accountability for the implementation of health policies, it is important to highlight that the heterogeneity among them can substantially influence the conduct and consolidation of PHCs in Brazil [5]. In this context, the Ministry of Health has induced the institutionalization of techniques, tools, and actions of planning, monitoring, and evaluation of processes and results through initiatives that strengthen the quality of services and improve work processes, favoring the expansion of access in various realms in the country [6].

In 2011, the National Program for Improvement of Access and Quality of Primary Care (PMAQ-AB) was established, with the purpose of expanding the qualified supply of health services in the PHC. To achieve this goal, it is imperative to introduce changes in the health care model and use health management tools to improve the work process of the teams and serve as a source of funding, with the transfer of resources to municipalities [7, 8].

Supported by the Marxist theory of work, Mendes Gonçalves formulated the concept of work process in health as a form of organization of services with the purpose of meeting users' needs [9].

Correspondingly, taking into account the theory of the work process in health and its components, the work in PHCs in Brazil should be driven by the guidelines of the National Primary Care Policy (NPPC) [4], which establishes the participation of all team members in the process of territorialization, planning, monitoring, and evaluation of actions, aiming to expand access to and the quality of health care.

Territorialization is defined in this study as the "process of appropriation of local space as a practice of bottom-up planning," from which the planning and implementation of strategic actions are facilitated [10]. Planning is understood as the prior establishment of a necessary course of action and an appropriate means to achieve certain objectives [11]. Monitoring corresponds to the systematic follow-up of one or more aspects of a given intervention [12]. Evaluation, in turn, is the emission of value judgment on a certain subject or intervention, comparing the resources used, the process, or the results, with previously established criteria and/or norms, contributing to the reflection of the dynamics of the work process [11, 13].

However, studies have indicated distinct differences in the way PHC teams organize and conduct the work process, with difficulties in the adoption of managerial tools for conducting activities in relation to the various realities of performance, determined by the location of the teams [15–18].

However, there is a lack of research on the work process of PHC teams in Brazilian municipalities, which consider the rural-urban typology proposed by the Brazilian Institute of Geography and Statistics (IBGE). Moreover, the inclusion of such typology within the scope of PHCs is relatively new, dating back to 2019, when it became the basis for the calculation of part of the financial incentives intended for PHCs [19].

In view of the above, this article seeks to evaluate the work process of PHC teams in Brazil from the rural/urban municipal typology.

Methods

Study Design And Population

This is an evaluative research of the quantitative approach, with secondary data from the third cycle of PMAQ-AB, coordinated by the Brazilian Ministry of Health, from 2017 to 2018. The data came from two sources: microdata from Module II of the External Evaluation of the III Cycle of PMAQ-AB obtained from the website of the Ministry of Health [20] and the rural/urban classification of the Brazilian Institute of Geography and Statistics [21].

During the approval period, Brazil had 41,554 teams registered in the National Register of Health Establishments (NRHE) [22]. Among these, 38,865 primary care teams for oral health (eAB/SB) and primary care teams (eAB), adhered to the third cycle of PMAQ-AB, distributed among the five Brazilian geographic regions as follows: Midwest (2,669 teams), Northeast (14,489), North (3,199), Southeast (12,854), and South (5,654).

Accordingly, 93.5% of Brazilian eABs adhered to the third cycle of the PMAQ-AB. We excluded 1,515 teams (3.89%) that did not participate in all stages of external evaluation. Therefore, the sample comprised 37,350 teams (96.10% of the total number of approved teams and 89.9% of the teams listed in the NRHE).

Study Variables

The bank was organized in Microsoft Excel® and the variables referring to the organization of the work process of primary care teams were selected, covering the subdimensions: Primary care team territorialization and reference population (II.6.1, II.6.2, II.6.3, II.6.7); Home Visiting (II.25.2); and Team Planning (II.8.1, II.8.2, II.8.3, II.8.4, II.8.5, II.8.6, II.8.7). We utilized the answers of the teams that proved the accomplishment of the action by presenting documents.

To categorize the number of people falling under the purview of each team, the absolute values reported were stratified based on the number of people per Family Health Strategy (FHS) recommended by NPPC [7] and classified as follows: less than 2,000 people/FHS; between 2,000 and 3,500 people/FHS; and above 3,500 people/FHS. In addition to the variables mentioned above, we used information on the geographical location of the teams and the typology of the municipality to which the teams belong to. The database with the rural/urban typology was obtained from the BIGS website in a *Microsoft Excel® software* file. Only the municipalities of origin of the teams included in this study were selected.

Regarding the rural-urban typology [21], we chose to classify Brazilian municipalities according to the BIGS criteria:

a.) Predominantly urban municipalities:

- municipalities in population units with more than 50,000 inhabitants in a dense occupation area;
- municipalities in population units that have between 25,000 and 50,000 inhabitants in a dense occupation area, with a degree of urbanization higher than 50%;
- municipalities in population units that have between 10,000 and 25,000 inhabitants in a dense occupation area, with a degree of urbanization higher than 75%.

b.) Intermediate municipalities:

- municipalities in population units that have between 25,000 and 50,000 inhabitants in a dense occupation area, with a degree of urbanization between 25% and 50%;
- municipalities in population units that have between 10,000 and 25,000 inhabitants in a dense occupation area, with a degree of urbanization between 50% and 75%;
- municipalities in population units that have between 3,000 and 10,000 inhabitants in a dense occupation area, with a degree of urbanization higher than 75%.

c.) Predominantly rural municipalities:

- municipalities in population units that have between 25,000 and 50,000 inhabitants in a dense occupation area, with a degree of urbanization of less than 25%;
- municipalities in population units that have between 10,000 and 25,000 inhabitants in a dense occupation area, with a degree of urbanization of less than 50%;
- municipalities in population units that have between 3,000 and 10,000 inhabitants in a dense occupation area, with a degree of urbanization of less than 75%.

In addition to the dimensions already presented, the element of location distinguishes among municipalities classified as intermediate and rural, those adjacent to urban centers of higher hierarchy from those that are remote. Therefore, the municipalities were classified according to the rural/urban typology into urban, adjacent intermediate, remote intermediate, rural adjacent, and rural remote.

The BIGS database, which contains the names of Brazilian municipalities, the identification code, and the classification according to rural/urban typology was *linked to* the database of the external evaluation of the health teams that joined the PMAQ-AB (module II). For the *linkage*, we used the variable "Geocode," common between the two databases. This procedure was performed using *Microsoft Office Excel® 2016 software*. To certify the accurate pairing of information, the name of the municipality and the unit of federation (UF) to which the teams belonged were verified.

Data analysis

All analyses were performed using *SPSS Statistics software* (version 20.0; IBM SPSS, Chicago, IL, USA). Initially, the descriptive statistics of the data were performed by calculating the absolute and relative frequencies, considering the perspective of Brazilian geographic regions and the municipal territorial cutout, using the rural/urban typology. Subsequently, using analytical statistics, the relationships between all variables and the groupings of variables were verified using multiple correspondence analysis (MCA).

MCA is a statistical technique of exploratory character that allows verification of the degree of interaction between categorical variables of contingency tables, through the graphical visualization of variables, as well as positioning groups of response in the same system of axes/dimensions [23, 24].

The perceptual map generated by MCA is composed of two axes, Dimensions 1 and 2. These dimensions serve as a comparison measure since they present the characteristics of the analyzed objects and are formed by the estimates of eigenvalues and inertia of the variables. The eigenvalues represent the percentage of variance explained in terms of differences between the dimensions and is a relative measure of how different the

dimensions are in the model. Specifically, the farther away from 1 the eigenvalues are, the greater the variations between the dimensions explained by the model. Inertia is the contribution of a given category of variables to the variation in the data. The approximate inertias of categories form clusters of categories of variables. The discrimination measures (DMs) indicate the most relevant variables for the formation of each axis/dimension, and the centroid coordinates (CCs) assist in locating each category on the perceptual map [24].

When there is similarity between categories, greater geometric proximity is noted between the categories investigated; thus, the formation of one or more defined "profiles" of the data set. Visual description of the association between variables can provide a more intuitive view of the nature of the association or interaction between categorical variables, compared to numerical summaries [24, 25].

Results

The 37,350 primary care teams analyzed were distributed among 28,897 primary health units in 5,310 Brazilian municipalities. Regarding the distribution of the teams by region, it was observed that 13,836 (37.0%) teams were in the Northeast, 12,346 (33.1%) in the Southeast, 2,637 (7.1%) in the Midwest, 3,058 (8.2%) in the North, and 5,473 (14.7%) in the South.

The largest number of participating municipalities was in the adjacent rural type (54.6%), and the smallest in the remote intermediate type (1.1%). Regarding the distribution of teams by municipal strata, most were located in urban municipalities (59.3%), and the lowest percentages of participating teams were in the remote intermediate (0.9%) and remote rural (2.8%) strata.

Table 1 shows the distribution of variables related to territorialization by municipal strata. It is observed that, in the national context, most of the participating teams used territorial maps (94.0%), presenting approximate values among the strata, with emphasis on the remote intermediate stratum, which presented a lower percentage than the others (84.7%).

It is evident that there was an uncovered population in the coverage territory in 34.0% of the evaluated teams. The adjacent rural municipalities showed the lowest percentage of teams with a positive response to this variable (21.0%). Concurrently, the intermediate remote and urban municipalities showed a higher percentage of teams with uncovered populations in the surroundings of their territories (43.6% and 42.0%, respectively), as well as those with the largest population discovered by the community health agent (47.5% and 49.0%, respectively).

Although 99.5% of the studied teams had the presence of a community health agent professional, information about the existence of a population not followed by the community health agent was registered by 40.0% of the teams.

It was also observed that the consideration of risk and vulnerability criteria for the definition of the number of people under the ambit of the teams was reported in a positive way, especially in adjacent intermediate municipalities (76.2%) and adjacent rural municipalities (74.0%). The teams in remote rural municipalities presented the highest percentage of not being aware of the adoption of this measure (14.0%).

Furthermore, when evaluating the number of people registered under the purview of the teams, the national average was 3,138.45 people per team. The adjacent intermediate municipalities showed a higher percentage of

teams with reference population in the range of 2,000 to 3,500 people/team, with urban municipalities remaining conspicuous, with 43.0% of the teams with reference population above 3,500 people/team.

Table 1
Distribution of teams, according to municipal typology and territorialization characteristics.

Variable	Adjacent Intermediate		Remote Intermediate		Rural Adjacent		Rural Remote		Urban		Brazil	
	n	%	n	%	n	%	n	%	n	%	n	%
Existence of maps of the territory												
Yes	3341	94.8	254	84.7	8738	93.0	795	90.0	19801	94.0	32929	94.0
No	183	5.2	46	15.3	652	6.9	87	9.9	1170	5.6	2138	6.1
Existence of an uncovered population in the territory												
Yes	1069	28.8	149	43.6	2077	21.0	313	30.0	9214	42.0	12822	34.0
No	2643	71.2	193	56.4	8007	79.0	739	70.0	12946	58.0	24528	66.0
Existence of an ACS uncovered population in the territory												
Yes	1236	33.4	162	47.5	2534	25.0	338	32.0	10706	49.0	14976	40.0
No	2466	66.6	179	52.5	7517	75.0	713	68.0	11307	51.0	22182	60.0
Availability of information that helps management analyze the health situation of the population in the catchment area												
Yes	3452	93.0	294	86.0	9362	93.0	927	88.0	19926	90.0	33961	91.0
No	260	7.0	48	14.0	722	7.2	125	12.0	2234	10.0	3389	9.1
Consideration of risk and vulnerability criteria to define the target population												
Yes	2828	76.2	224	65.5	7482	74.0	686	65.0	15619	71.0	26839	72.0
No	564	15.2	74	21.6	1615	16.0	220	21.0	4457	20.0	6930	19.0
Don't know	320	8.6	44	12.9	987	9.8	146	14.0	2084	9.4	3581	9.6
Target population (people/team)												
< 2000	982	26.5	89	26.0	3589	36.0	435	41.0	2788	13.0	7883	21.0
2000–3500	1934	52.1	156	45.6	5178	51.0	486	46.0	9844	44.0	17598	47.0
> 3500	796	21.4	97	28.4	1317	13.0	131	13.0	9528	43.0	11869	32.0

Information regarding action planning, monitoring, and analysis of indicators, and self-assessment is presented in Table 2.

In the general context, planning was not executed by 15.1% of the participating teams. The urban stratum presented the highest percentage of positive responses to the variable (85.7%). The municipalities located near

urban centers (adjacent) showed higher percentages of teams that performed planning, when compared to those with remote characteristics.

The frequency of planning meetings involved a predominance of monthly (46.9%) and weekly (23.3%) activities. The monitoring and analysis of health indicators and information were performed by a significant portion of the teams (87.9%), and the values were similar among the municipal strata with similar location characteristics, with lower percentages observed in the strata of remote locations (remote rural (79.6%) and remote intermediate with 80.1%).

Regarding self-evaluation, 88.7% of the teams carried out some processes during the year prior to the application of the questionnaire. However, there is a difference between the strata of analysis, with higher percentages of completion by teams from adjacent municipalities (intermediate and rural) with values of 90.4% and 89.0%, respectively. Approximate values were observed among municipalities that had the same location characteristics.

Table 2

Distribution of teams, according to municipal typology and planning, monitoring and self-evaluation actions.

Variable	Adjacent Intermediate		Remote Intermediate		Rural Adjacent		Rural Remote		Urban		Brazil	
	n	%	n	%	n	%	n	%	n	%	n	%
Performance of planning activities by the team												
Yes	3017	84.3	235	71.9	8272	84.7	751	75.9	18306	85.7	30581	84.9
No	560	15.7	92	28.1	1496	15.3	238	24.1	3060	14.3	5446	15.1
Periodicity												
Weekly	538	15.0	64	19.6	1232	12.6	138	14	6426	30.1	8398	23.3
Biweekly	597	16.7	42	12.8	1591	16.3	135	13.7	3033	14.2	5398	15.0
Monthly	2038	57.0	182	55.7	6016	61.6	587	59.4	8063	37.7	16886	46.9
Bimonthly or greater	404	11.3	39	11.9	929	9.5	129	13.0	3844	18.0	5345	14.8
Conducting monitoring and analysis of health indicators and information												
Yes	3330	89.7	274	80.1	8943	88.7	837	79.6	19459	87.8	32843	87.9
No	382	10.3	68	19.9	1141	11.3	215	20.4	2701	12.2	4507	12.1
Conducting a self-assessment process												
Yes	3354	90.4	271	79.2	8974	89.0	841	79.9	19706	88.9	33146	88.7
No	358	9.6	71	20.8	1110	11.0	211	20.1	2454	11.1	4204	11.3

Initially, MCA was performed with all the variables included in the study. However, owing to the number of variables, visual interpretation was hindered by the overlapping of information. Therefore, to facilitate the interpretation of the perceptual maps, separate MCAs were performed for two groups of variables related to the

organization of the teams' work process: territorialization characteristics and planning, monitoring, and self-evaluation.

In the MCA, for the territorialization characteristics it was identified, for the first and second dimensions, respectively, an eigenvalue of 1.939 and 1.278 and an inertia of 0.277 and 0.183, respectively, indicating that Dimension 1 is significant for data behavior. In Table 3, it is possible to verify the distribution of the DM of the variables studied and the CC of each category resulting from MCA for the two dimensions.

Table 3
DM and CC for MCA dimensions of the variables for territorialization.

Variable	Code	DM		CC	
		1	2	1	2
Rural-Urban Classification		0,294	0,268		
Adjacent Intermediate	I.Adj			0,394	-0,109
Remote Intermediate	I.Rem			-0,401	1,529
Rural Adjacent	R.Adj			0,771	0,546
Rural Remote	R.Rem			0,391	1,88
Urban	Urb			-0,435	-0,331
Existence of maps of the territory		0,006	0,149		
Yes	II.6.2S			0,038	-0,143
No	II.6.2N			-0,278	1,515
Existence of an uncovered population in the territory		0,599	0,000		
Yes	II.6.3S			-1,074	0,003
No	II.6.3N			0,557	0,009
Existence of an ACS uncovered population in the territory		0,62	0,000		
Yes	II.25.2S			-1,074	0,003
No	II.25.2N			0,557	0,009
Availability of information that helps management analyze the health situation of the population in the catchment area		0,1	0,337		
Yes	II.8.11S			0,097	-0,176
No	II.8.11N			-1,005	1,844
Consideration of risk and vulnerability criteria to define the target population		0,098	0,329		
Yes	II.6.6S			0,192	-0,35
No	II.6.6N			-0,543	0,834
Don't know	II.6.6NS			-0,42	1,079
Target population (people/team)		0,222	0,195		
< 2000	II.6.7.A			0,507	0,825
2000–3500	II.6.7.B			0,221	-0,097
> 3500	II.6.7.C			-0,675	-0,383

In the perceptual map resulting from the MCA, the approximate inertias of categories form some clusters, perceiving in the lower right space, where the adjacent intermediate municipal stratum is located, the formation of a cluster of categories considered positive for the territorialization process. In the second set, other categories that express weaknesses in the territorialization process are close to the urban category. Another cluster occurs between the "remote intermediate" category and the categories considered to make it difficult to carry out territorialization (Fig. 1).

The categories R.Adj, R.Rem, II.6.7.A, and II.8.11N had inertias farther away from the groups formed, so they showed no association with other MCA categories.

Using the circles identified in Fig. 1, it is possible to visualize the formation of three groups of teams with territorialization characteristics, which are described in Chart 1.

Chart 1. Groups formed from the association of territorialization characteristics with the municipal typology

Group	Features
G1	Formed mainly by teams located in municipalities of the adjacent intermediate type, which use territory maps, have no community health agent uncovered population, with attached population within the parameter recommended by NPPC, and which receive support from the municipal management for monitoring and population parameterization.
G2	Formed mainly by teams located in urban-type municipalities that have an uncovered population in their territory and that report having an assigned population of more than 3,500 people.
G3	Formed mainly by teams located in remote intermediate type municipalities with low approximation to positive territorialization characteristics.

In the MCA performed with the variables related to the planning, monitoring, and self-evaluation characteristics, the eigenvalues of 1.477 and 1.263 and inertia of 0.295 and 0.253 were found for the first and second dimensions, respectively. The DM of the variables studied and the CC of each category resulting from the MCA for the two dimensions are shown in Table 4.

Table 4
DMs and CCs for the MCA dimensions of the variables on planning, monitoring and self-evaluation

Variable	Code	DM		CC	
		1	2	1	2
Rural/Urban Classification		0,074	0,653		
Adjacent Intermediate	I.Adj			0,078	0,826
Remote Intermediate	I.Rem			-1,41	0,365
Rural Adjacent	R.Adj			-0,057	1,075
Rural Remote	R.Rem			-1,362	0,543
Urban	Urb			0,059	-0,667
Carrying out action planning		0,315	0,000		
Yes	II.8.3S			0,278	-0,001
No	II.8.3N			-1,314	0,056
Periodicity of planning meetings		0,02	0,586		
Weekly	II.8.4SEM			0,123	-1,069
Biweekly	II.8.4QUIN			-0,017	0,2
Monthly	II.8.4MEN			-0,077	0,726
Bimonthly or greater	II.8.4BIM+			0,316	-0,768
Conducting monitoring and analysis of health indicators and information		0,538	0,015		
Yes	II.8.5S			0,248	0,04
No	II.8.5N			-2,004	-0,331
Conducting a self-assessment		0,530	0,010		
Yes	II.8.7S			0,235	0,03
No	II.8.7N			-2,066	-0,28

The rural/urban classification variable again showed an approximation among categories with similar location characteristics. As shown in Fig. 2, there was the formation of two groups with distinct association patterns when the teams' location categories were observed.

Group 1 is essentially composed of teams located in urban and adjacent municipalities (adjacent rural and adjacent intermediate), which reported executing planning, monitoring, and self-assessment.

Group 2 mainly comprises teams located in the "remote intermediate" and "remote rural" municipal strata, whose orthogonal points are far from the positive response categories, that is, these teams did not perform planning, monitoring, and self-evaluation.

Discussion

An increasing number of primary care and oral health teams participating in the National Program for Improvement of Access and Quality of Primary Care (PMAQ) was observed over the three cycles. In the first cycle, there were 17,482 teams, 30,522 in the second, and 38,865 in the third [20].

Despite voluntary adhesion by both the health teams and the municipal managers, a massive participation of teams was noted in the third cycle (93.5%), with approximately 90% of the teams in the NRHE being interviewed at the time of the publication of the homologation decree.

It is worth noting that in recent years, the number of primary healthcare teams in the country has expanded exponentially, especially the FHS [22]. This process was influenced by the creation of the Mais Médicos Program in 2013, responsible for reformulating more than 57.3% of conventional primary care teams to family health teams, especially in municipalities with less than 30,000 inhabitants, which directly impacted the substantial increase in population coverage by PHCs [26, 27].

A nationwide study indicated that more than half of the Brazilian population reported being registered in a primary health unit, and that rural areas have a higher prevalence of linkage when compared to urban areas [28]. The evolution of indicators of installed capacity and use of services denotes a growing appreciation of primary care in Brazil [29, 30].

Regarding the territorialization profiles observed in this study, we noticed that even though the teams located in remote municipalities have fewer people linked to them, they are more likely to not use organizational and epidemiological information and tools in the territorialization process. In contrast, the teams located in adjacent municipalities show an association with positive territorialization factors. We understand that adjacent municipalities have medium population size, moderate urbanization rate, and geographical proximity to predominantly urban municipalities, and thus suffer strong influences from them, absorbing characteristics of development and growth.

Calvo et al. [31] acknowledged these findings when they pointed out that the urbanization rate and demographic density are important factors to be considered in evaluation studies, since municipalities with lower population concentrations are more susceptible to unfavorable factors for health management, owing to local characteristics of access to services, as well as the difficulty in hiring human resources.

With regard to the teams located in urban municipalities, despite showing association with positive characteristics of the territorialization process, they also show an association with the existence of uncovered populations within their territories and with an enrolled population higher than recommended by the NPPC.

In line with the findings of this study, the authors point out that the difficulties related to the attachment/enrollment of the population to PHC teams in urban municipalities may be related to the existence of care gaps in intra-urban areas, in which the distribution and supply of services may be hindered by the social dynamics of these localities [32].

We highlight the important expansion of low-income housing developments to peripheral locations in large urban centers, contributing to the worsening of the historical difficulties of access to basic citizenship services, including PHCs in municipalities with large populations [33–35].

It is important to emphasize the close relationship between the attachment/enrollment of the population to the teams and the characterization of rural and urban areas through the institution of the Previne Brazil Program [19], using the weighted method for part of the financing of the teams, replacing the model used in the last decades, with the extinction of the fixed and variable Primary Care Pisos and the establishment of a new form of payment for performance.

Previne Brazil [19] recommends the automatic parameterization of 2,000 to 4,000 people for an FHS, with the quantitative potential defined as follows: urban municipality (4,000 people), adjacent intermediate or adjacent rural municipality (2,750), remote intermediate or remote rural municipality (2,750).

The study shows that the teams studied were already close to the standard of the enrolled population established by Previne Brazil. For Harzheim [36], the weighted capitation model strengthens the principle of universality through the accountability of the health system for users, longitudinality of financing for the care of people effectively enrolled in the teams, and better allocation of resources for PHC teams.

However, the new proposal for financing and organization of PHCs has drawn criticism for the individualizing focus of the care model and the work process. This focus is opposed to the perspective of the FHS structure that is based on territory, multidisciplinary, community-based work, and integral care [37].

Simultaneously, scholars point out that the proposals to change the financing patterns translate historical claims of managers, especially of the most populous municipalities and located in the most developed regions of the country, such as the South and Southeast. These regions have low coverage of FHS and opt for the traditional model of primary care to the detriment of the proposed FHS [38].

Regarding other characteristics of the organization of the work process evaluated in this study, there are differences in the patterns of the teams in different municipal strata, as well as in the distance from the adoption of techniques and instruments for planning, monitoring, and self-evaluation by the teams belonging to remote municipalities, while those located in urban and adjacent municipalities show a positive association with regard to such aspects of the organization of the work process.

Corroborating the findings of this study, Cruz et al. [14] emphasized that the performance of activities related to action planning by PHC teams is less frequent in small and medium-sized cities than in large cities.

Such observations may be related to losses in the organization of the work process, caused by the difficulty in attracting and retaining qualified human resources, especially in municipalities located far from large urban centers [39, 40]. These losses are expressed in the high turnover of professionals to compose the teams, reflecting the loss of strategic people, disruption in the planning of the work process, and consequent organizational deficiencies [41].

Other factors may also be related, such as the difficulty faced by the teams to use the information produced and recorded in the information systems in their field of action, in order to assist in planning and reorganizing the work process, the low expansion of continuing education actions in the scope of PHC to the municipalities in the interior, and the fragilities in access to the Internet [42–44].

Conclusions

The results presented in this study suggest that there are important differences in the work process of PHC teams, which vary according to the characteristics of the municipalities in which they are located. The teams located in urban municipalities or adjacent to them present a greater association with the use of tools and methods of work organization.

Considering the nature of the analysis employed and the complexity of the work in PHCs, the data presented in this plan reflect the non-adoption of organizational practices by an important proportion of PHC teams, especially those in remote municipalities. However, it is not possible to identify whether this situation is related to the fragility of employment ties of professionals in the teams, scarcity of resources to strengthen local PHCs, and low investments in continuing education strategies and institutional support, which represents a gap for future research.

Considering its national scope, the results of this research clearly indicate the need to effectively incorporate the NPPC guidelines in terms of the work process, taking into account local specificities.

Abbreviations

eAB/SB: Primary Care with Oral Health; MCA: Multiple Correspondence Analysis; PHC: Primary Health Care; CC: Centroid coordinate; NRHE: National Register of Health Establishments; eAB: Primary Care Teams; eSF: Family Health Team; FHS: Family Health Strategy; BIGS: Brazilian Institute of Geography and Statistics; DM: Discrimination Measure; SDGs: Sustainable Development Goals; PMAQ-AB: National Program for Improving Access and Quality of Primary Care; NPPC: National Policy for Primary Care; BHU: Basic Health Unit.

Declarations

Acknowledgements: Not applicable.

Authors' contributions: All authors have made substantial contribution to (1) Conception or design (ML, CLFC e HHCP), or acquisition (ML, CLFC e HHCP), analysis or interpretation of data (ML, CLFC, HHCP e AACP), for the work; (2) Drafting the work (ML, CLFC, HHCP e AACP) or revising it critically for important intellectual content (NNBS, MSCBOB, GRONF e LGL); (3) Final approval of the version to be published (ML, CLFC, HHCP, AACP, NNBS, MSCBOB, GRONF e LGL); (4) Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved (ML, CLFC, HHCP, AACP, NNBS, MSCBOB, GRONF e LGL).

Funding Sources: This study was funded by the authors.

Data availability: The data analyzed for the current study are available on the Ministry of Health's website, on the Primary Health Care Secretariat page, at: <http://aps.saude.gov.br/ape/pmaq/ciclo3/>, and on the Brazilian Institute of Geography and Statistics website, at https://www.ibge.gov.br/apps/rural_urbano/.

Ethical approval: The data used in this study are available in the public domain. For this reason, it does not require review by the Research Ethics Committee. However, all procedures were in accordance with the ethical

standards of the institutional and/or national research committee as well as the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Consent for publication: Not applicable.

Competing interests: The authors declare that they have no conflicts of interest.

References

1. Massuda, A. Primary health care financing changes in the Brazilian Health System: advance ou setback?. *Ciênc. saúde coletiva*. 2020;25(4):1181–88. <https://doi.org/10.1590/1413-81232020254.01022020>
2. United Nations (UN). UN General Assembly. Resolution 74/2: political declaration of the high-level meeting on universal health coverage New York: UN; 2019 [cited 2021 Jul 09]. Available from: <https://undocs.org/en/A/RES/74/2>.
3. Arantes LJ, Shimizu HE, Merchán-Hamann E. The benefits and challenges of the Family Health Strategy in Brazilian Primary Health care: a literature review. *Ciênc. saúde colet*. 2016;21(5):1499–510. <https://doi.org/10.1590/1413-81232015215.19602015>
4. Ministry of Health (BR). Portaria nº 2.436, de 21 de setembro de 2017. Approves the National Policy for Primary Care, establishing the revision of guidelines for the organization of Primary Care, under the Unified Health System (UHS). Brasília: Ministry of Health, 2017 [cited 2021 Jul 09]. Available from: https://bvsms.saude.gov.br/bvs/saudelegis/gm/2017/prt2436_22_09_2017.html [Portuguese].
5. Pinto LF, Giovanella L. The Family Health Strategy: expanding access and reducing hospitalizations due to ambulatory care sensitive conditions (ACSC). *Ciênc. saúde coletiva*. 2018;23(6):1903–14. <https://doi.org/10.1590/1413-81232018236.05592018>
6. Ministry of Health (BR). Evaluation in Primary Health Care: institutionalization paths. Brasília: Ministry of Health, 2005 [cited 2021 Jul 09]. Available from: http://189.28.128.100/dab/docs/publicacoes/geral/avaliacao_ab_portugues.pdf [Portuguese].
7. Ministry of Health (BR). Portaria no 1.654, de 19 de julho de 2011. It institutes, within the scope of the Unified Health System, the National Program for Improving Access and Quality of Primary Care (PMAQ-AB) and the Financial Incentive of the PMAQ-AB, called Floor Quality Component, 2011 [cited 2021 Jul 09]. Available from: http://bvsms.saude.gov.br/bvs/saudelegis/gm/2011/prt1654_19_07_2011.html [Portuguese].
8. Pinto HA, Sousa ANA, Ferla AA. The National Program to Improve Access and Quality of Primary Care: several faces of an innovative policy. *Saúde debate*. 2014;51:43–57. <https://doi.org/10.5935/0103-1104.2014S027> [Portuguese]
9. Mendes-Gonçalves RB. Health Practices: work processes and needs. 1th ed. São Paulo: CEFOR, 1992. [Portuguese]
10. Unglert CVS. Territorialization in Health: the conquest of local space as a practice of ascending planning. São Paulo: Thesis [Free Teaching in Public Health] - Faculty of Public Health, University of São Paulo, 1995 [cited 2021 Jul 09]. Available from: <https://repositorio.usp.br/item/000744045> [Portuguese].
11. Pessoa VM, Rigotto RM, Carneiro FF, Teixeira ACA. Meanings and methods of territorialization in primary health care. *Ciênc. saúde colet*. 2013;18(8):2253–62. <https://doi.org/10.1590/S1413-81232013000800009>

[Portuguese]

12. Chiavenato I, Sapiro A. Strategic planning. 2th ed. Rio de Janeiro: Elsevier; 2009. [Portuguese]
13. Sousa AN. Monitoring and evaluation in primary care in Brazil: recent experience and challenges for its consolidation. *Saúde debate*. 2018;42(spe1):289–301. <https://doi.org/10.1590/0103-11042018S119> [Portuguese]
14. Cruz MM, Souza RBC, Torres RMC, Abreu DMF, Reis ACG, Gonçalves AL. Uses of planning and self-assessment in the work processes of Family Health teams in Primary Care. *Saúde debate*. 2014;38. <https://doi.org/10.5935/0103-1104.2014S010> [Portuguese]
15. Bertusso FR, Rizzotto MLF. PMAQ in the view of workers who participated in the program in Region of Health of Paraná. *Saúde debate*. 2018;42(117):408–19. <https://doi.org/10.1590/0103-1104201811705>
16. Ferreira LR, Silva Júnior JA, Arrigotti T, Neves VR, Rosa AS. Influences of the program for access and quality improvement in work processes in primary care. *Rev Esc Enferm USP*. 2018;52:e03407. <http://dx.doi.org/10.1590/S1980-220X2017046403407>
17. Fontana KC, Lacerda JT, Machado PMO. Work Process in Primary Health Care: evaluation of management. *Saúde debate*. 2016;40(110):64–80. <https://doi.org/10.1590/0103-1104201611005> [Portuguese]
18. Medrado JRS, Casanova AO, Oliveira CCM. Evaluative study of the working process of Primary Care Teams from PMAQ-AB. *Saúde debate*. 2015;39(107):1033–43. <https://doi.org/10.1590/0103-110420161070360> [Portuguese]
19. Ministry of Health (BR). Portaria nº2.979 GM/MS, de 12 de novembro de 2019. It institutes the Prevent Brazil Program, which establishes a new financing model for the cost of Primary Health Care within the scope of the Unified Health System, through the amendment of Consolidation Ordinance No. 6/GM/MS, of September 28, 2017. Brasília: Ministry of Health, 2019 [cited 2021 Jul 09]. Available from: <https://www.in.gov.br/en/web/dou/-/portaria-n-2.979-de-12-de-novembro-de-2019-227652180> [Portuguese].
20. Ministry of Health (BR). Access and Quality Improvement Program – 3rd cycle. Department of Primary Health Care. 2020 [cited 2021 Jul 09]. Available from: <http://aps.saude.gov.br/ape/pmaq/ciclo3/> [Portuguese].
21. Brazilian Institute of Geography and Statistics. Classification and characterization of rural and urban spaces in Brazil. 2017 [cited 2021 Jul 09]. Available from: https://www.ibge.gov.br/apps/rural_urbano/ [Portuguese].
22. Ministry of Health (BR). History of the amount of teams and services costed. Department of Primary Health Care. 2020 [cited 2021 Jul 09]. Available from: <https://egestorab.saude.gov.br/paginas/acessoPublico/relatorios/relHistoricoPagamentoEsf.xhtml> [Portuguese].
23. Infantosi AFC, Costa JCGD, Almeida RMVR. Correspondence Analysis: a theoretical basis for categorical data interpretation in Health Sciences. *Cad Saude Publica*. 2014;30(3):473–86. <https://doi.org/10.1590/0102-311X00128513> [Portuguese]
24. Hair J, Black W, Babin B, Rolph A, Tatham R. Analyzing nominal data with correspondence analysis. In: Hair J, Black W, Babin B, Rolph A, Tatham R, org. *Multivariate data analysis*. 9th ed. Porto Alegre: Bookman; 2009. p. 595–603.

25. Beh EJ. Simple Correspondence Analysis of Nominal-Ordinal Contingency Tables. *J Appl Math Decis Sci*. 2008;1–18. <https://doi.org/10.1155/2008/218140>
26. Miranda GMD, Mendes ACG, Silva ALA, Santos Neto PM. Family Health Team Expansion And The More Doctors Program In Brazilian Municipalities. *Trab Educ e Saúde*. 2017;15(1):131–45. <https://doi.org/10.1590/1981-7746-sol00051> [Portuguese]
27. Hone T, Powell-Jackson T, Santos LMP, Soares RS, Oliveira FP, Sanchez MN, et al. Impact of the Programa Mais médicos (more doctors Programme) on primary care doctor supply and amenable mortality: quasi-experimental study of 5565 Brazilian municipalities. *BMC Health Serv Res*. 2020;20:873. <https://doi.org/10.1186/s12913-020-05716-2>
28. Malta DC, Santos MAS, Stopa SR, Vieira JEB, Melo EA, Reis AAC. Family Health Strategy Coverage in Brazil, according to the National Health Survey, 2013. *Ciênc. saúde colet*. 2016;21(2):327–38. <https://doi.org/10.1590/1413-81232015212.23602015>
29. Campos GWS, Pereira Júnior N. Primary care in Brazil, and the Mais Médicos (More Doctors) Program in the Unified Health System: achievements and limits. *Ciênc. saúde colet*. 2016;21(9):2655–63. <https://doi.org/10.1590/1413-81232015219.18922016>
30. Souza ASS, Braga JU. Trends in the use of health services and their relationship with multimorbidity in Brazil, 1998–2013. *BMC Health Serv Res*. 2020;20:1080. <https://doi.org/10.1186/s12913-020-05938-4>
31. Calvo MCM, Lacerda JT, Colussi CF, Schneider IJC, Rocha TAH. Municipalities Stratification for Health Performance Evaluation. *Epidemiol. Serv. Saude*. 2016;25(4):767–76. <https://doi.org/10.5123/S1679-49742016000400010> [Portuguese]
32. Maia AG, Quadros WJ. Municipal typology of socio-occupational classes: A new dimension for the analysis of territorial inequalities in Brazil. *Rev Econ e Sociol Rural*. 2009;47(2):389–418. <https://doi.org/10.1590/S0103-20032009000200004> [Portuguese]
33. Bousquat A, Giovanella L, Fausto MCR, Medina MG, Martins CL, Almeida PF, et al. Primary care in health regions: policy, structure, and organization. *Cad. Saúde Pública*. 2019;35(suppl 2). <https://doi.org/10.1590/0102-311X00099118> [Portuguese]
34. Moura JM. "Minha Casa, Minha Vida" Program at the Metropolitan Region of Natal: a sociospatial analysis of the impact of the segregation and deterritorialization. *URBE, Rev. Bras. Gest. Urbana*. 2014;6(3):339–59. <https://doi.org/10.7213/urbe.06.003.AC05> [Portuguese]
35. Miclos PV, Calvo MCM, Colussi CF. Evaluation of the performance of actions and outcomes in primary health care. *Rev. Saude Publica*. 2017;51:1–10. <https://doi.org/10.11606/S1518-8787.2017051006831>
36. Harzheim E. "Previne Brasil": Bases of the Primary Health. *Ciênc. saúde colet*. 2020;25(4):1189–96. <https://doi.org/10.1590/1413-81232020254.01552020>
37. Morosini MVGC, Fonseca AF, Baptista TWF. Previne Brasil, the Agency for the Development of Primary Healthcare, and the Services Portfolio: radicalization of privatization policy in basic healthcare? *Cad Saude Publica*. 2020;36(8). <https://doi.org/10.1590/0102-311X00040220>
38. Cecilio LCO, Reis AAC. Notes on persistent challenges for basic health care in Brazil. *Cad Saude Publica*. 2018;34(8). <https://doi.org/10.1590/0102-311X00056917>
39. Ney MS, Rodrigues PHA. Critical factors for setting the physician in the Family Health Strategy. *Physis*. 2012;22(4):1293–311. <https://doi.org/10.1590/S0103-73312012000400003> [Portuguese]

40. Van Stralen ACS, Massote AW, Carvalho CL, Girardi SN. Physician's perception on attracting and retaining factors in remote and underserved areas: shortage route. *Physis*. 2017;27(1):147–72. <https://doi.org/10.1590/S0103-73312017000100008> [Portuguese]
41. Medeiros CRG, Junqueira ÁGW, Schwingel G, Carreno I, Jungles LAP, Saldanha OMFL. Nurses and doctors turnover: an impasse in the implementation of the Family Health Strategy. *Ciênc. saúde colet*. 2010;15(suppl 1):1521–31. <https://doi.org/10.1590/S1413-81232010000700064> [Portuguese]
42. Machado JFFP, Carli AD, Kodjaoglanian VL, Santos MLM. Continuing education in the daily of Primary Care in Mato Grosso do Sul. *Saúde debate*. 2015;39(104):102–13. <https://doi.org/10.1590/0103-110420151040223> [Portuguese]
43. Martins LMP, Silva EM, Marques D. Health information in the perspective of family health nurses. *Rev Min Enferm*. 2016;20. <http://www.dx.doi.org/10.5935/1415-2762.20160002> [Portuguese]
44. Vidor AC, Fisher PD, Bordin R. Use of health information systems in small municipalities in Southern Brazil. *Rev. Saude Publica*. 2011;45(1):24–30. <https://doi.org/10.1590/S0034-89102011000100003> [Portuguese]

Figures

Figure 1

Association map of the variables related to team location and territorialization characteristics.

Figure 2

Association map of the variables about planning, monitoring, and self-evaluation and location of the teams.