

RESEARCH

Open Access



Primary care and care continuity in the context of a health crisis: lessons learned from the Brazilian reality

Mônica Martins de Oliveira Viana^{1*} , Mariana Tarricone Garcia¹ , Maria Izabel Sanches Costa² ,
Lígia Schiavon Duarte¹ , Arnaldo Sala¹ , Barbara Maia Pontes³ and Michelle Fernandez³ 

Abstract

Introduction Primary health care (PHC) is crucial for achieving universal health coverage, particularly in low- and middle-income countries, where it has been linked to reducing health inequalities and providing financial protection. It is distinguished from other care levels by its essential attributes: longitudinality, first-contact care, comprehensiveness, and care coordination across the network. PHCs played a crucial role during the COVID-19 pandemic, and providing continuous care while coordinating testing and contact tracing was challenging. It is necessary to adapt its operations to ensure care. This study explores the influence of essential PHC attributes and local organizational strategies on care continuity during the pandemic.

Methods A quantitative cross-sectional study was conducted with health managers from municipalities in the state of São Paulo in a sample stratified by population size. The survey was applied in 259 municipalities, and the weighted analysis considered 553 municipalities. We evaluated indicators related to care continuity in PHC, convergence with essential PHC attributes, local strategies such as telecare, and the adaptation of PHC units (UBSs) to an exclusive COVID-19 PHC service. Statistical analyses included Pearson's correlation and multiple linear regression.

Results Care continuity in PHC was significantly associated with convergence of essential PHC attributes ($r=0.453$, $p=0.000$), PHC coverage, investment in telecare, and the transformation of UBS to care exclusively for COVID-19 patients. The regression model revealed that these variables significantly influenced care maintenance during the pandemic, and convergence of essential PHC attributes was the most relevant factor.

Conclusion Convergence in the essential attributes of comprehensive PHC was crucial for care continuity during the pandemic. Owing to the essential attributes of comprehensive PHC, continued strengthening of PHC is necessary to ensure the resilience of health systems, and we recommend future studies on the implementation of the essential attributes of comprehensive PHC.

Keywords Primary health care, Health systems, Health services, Healthcare models, Comprehensive health care, Continuity of patient care, Brazil, COVID-19

*Correspondence:
Mônica Martins de Oliveira Viana
monica.psisaude@gmail.com; monica.viana@isaude.sp.gov.br

¹Health Institute - Secretaria do Estado da Saúde de São Paulo, Rua Santo Antônio, 590, Bela Vista, São Paulo 01314-000, Brazil

²School of Public Health, University of São Paulo, São Paulo, Brazil

³Political Science Institute, University of Brasília, Brasília, Brazil



© The Author(s) 2026. **Open Access** This article is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License, which permits any non-commercial use, sharing, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if you modified the licensed material. You do not have permission under this licence to share adapted material derived from this article or parts of it. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by-nc-nd/4.0/>.

Background

Primary health care (PHC) has played a fundamental role in improving global health and well-being for over 40 years, resulting in a significant decline in maternal, neonatal, and child mortality and deaths from diseases such as HIV/AIDS, malaria, tuberculosis, and vaccine-preventable diseases [1, 2]. The main distinctions between PHC and other care levels are the fundamental attributes guiding care: longitudinality, first-contact care, comprehensiveness, and care coordination in the network [3]. The organization of these attributes may vary under different health systems. However, PHC attributes tend to be strengthened with proximity to the territory, community care initiatives, and investment in professionals trained to work with family and community medicine [3, 4]. Thus, we would have comprehensive primary health care available to users with these strengthened PHC attributes.

Comprehensive primary health care (PHC) is even more important when its effectiveness in low- and middle-income countries is taken into consideration. Robust evidence indicates that implementing a comprehensive PHC approach in these countries ensures equitable access to care and protection against financial hardship [5, 6]. Thus, PHC is widely recognized as essential for achieving universal health coverage and reducing health inequalities [7].

Research has highlighted the importance of PHC during the COVID-19 pandemic [8, 9], which can be understood as a recent example of a severe health crisis on a global scale. During the crisis, PHC served as the first point of contact for individuals and communities and displayed the ability to adapt quickly during the pandemic [10–12]. In many places, PHC is responsible for coordinating testing, contact tracing, and monitoring patients in home isolation, which significantly affects the spread of the virus [13]. PHCs' ability to integrate preventive and curative care, offering a comprehensive care continuum, is crucial for preventing the collapse of health systems and ensuring that vulnerable populations continue to receive the care they need [14]. However, during the health crisis caused by the COVID-19 pandemic, concerns have been raised about care continuity [8, 15], especially for the population with chronic noncommunicable diseases and other conditions usually treated in PHC [10], such as immunization and maternal and child care.

Several responses were identified for care continuity in PHC. Some of the principal adaptations already mapped that reorganized care were telemedicine and telephone or video call appointments, virtual monitoring of patients, and reallocating the flow to specific units designated for COVID-19 cases [10, 12, 16–18]. However, we observe persistent gaps in the understanding of the role of

previous structuring of PHC's essential attributes (comprehensive PHC) in the responses implemented during the COVID-19 pandemic, especially regarding the associations between PHC attributes before the pandemic and dedicated care continuity responses.

Although studies have documented how primary care was adapted during COVID-19, including telemedicine and the reorganization of patient flows, the evidence remains limited on whether and how the pre-pandemic degree of comprehensive primary care, expressed by essential primary care attributes, is associated with the continuity of routine services during a health crisis. This question is particularly relevant in decentralized systems with substantial heterogeneity across local contexts. In Brazil, despite a growing literature describing PHC responses to the pandemic, there is still limited qualitative, municipality-level evidence linking differences in PHC work processes and local organizational strategies to continuity of care. In this way, this study does not aim to assess health outcomes or epidemiological effects, but rather to examine work processes and organizational features of primary health care models. Therefore, this study explores the influence of essential primary care attributes and local organizational strategies on municipalities' performance in maintaining continuity of care during the COVID-19 pandemic.

The Brazilian Unified Health System (SUS) is an interesting case for investigating this possible association. The SUS has continental proportions and aims to provide comprehensive healthcare to all citizens at the individual, family, and collective levels in PHC and specialized care. The SUS is under tripartite management, involving the federal, state, and municipal spheres that work together to finance and formulate health policies [19]. The municipalities (the spheres with the least state capacity [20] and the greatest territorial capillarity) are responsible for most of the provided services [21], especially PHC. Furthermore, they possess political-administrative autonomy to implement local organizational adaptations during the execution of policies and other guidelines formulated by higher levels of government. During sanitary crises—and most notably during the COVID-19 pandemic—the role of municipalities gained prominence due to the denialist stance adopted at the federal management level. It is worth highlighting the strategic role of municipal management in structuring a health system that is coherent with SUS guidelines while simultaneously adapting to local realities and needs. Given the large number of municipalities, 5,570 in total [22], we observe significant internal heterogeneity in Brazilian PHC regarding the implementation of comprehensive PHC attributes.

The state of São Paulo is among the most populous in the country within the Brazilian system. It harbors 645 municipalities of different population sizes and varying

levels of access to the specialized care network. It was one of the primary COVID-19 epicenters. São Paulo's PHC has different configurations regarding the care model adopted and has developed heterogeneous care guidelines for the pandemic [14, 23]. In conjunction with these aspects, the state of São Paulo can be taken as an interesting excerpt to constitute an analysis of the institutional care culture in Brazilian PHC, as it encompasses services in their most varied ways of implementing attributes.

Against this backdrop, it is important to assess whether municipalities with stronger pre-pandemic primary care capacity were better able to sustain the continuity of routine services during the COVID-19 crisis. Accordingly, this study examines the association between convergence with essential PHC attributes and continuity of care, accounting for local organizational strategies adopted during the pandemic. To address this objective, we conducted a cross-sectional study based on a statewide survey of municipal health managers in São Paulo, Brazil.

Methods

Study design and participants

This is a quantitative cross-sectional study with municipal health managers due to their role in decision-making on guidelines for organizing care within PHC. The study population consisted of a probabilistic sample of municipalities in the state of São Paulo stratified by population size to allow the analysis of characteristics in different settings. Thus, the sample was drawn from three strata: (i) municipalities with 50,000 inhabitants or more ($n = 139$); (ii) municipalities with between 10,000 and 50,000 inhabitants ($n = 239$); and (iii) municipalities with up to 10,000 inhabitants ($n = 267$). Stratum (i) municipalities with 50,000 inhabitants or more were surveyed in a census fashion for 139 municipalities, of which 132 participated in the study. For strata (ii) and (iii), the samples were defined using the presence of traditional PHC and ESF teams as criteria, totaling, in stratum (ii), a sample of 60 municipalities and, in (iii), a sample of 60 municipalities. In stratum (ii), 66 of the 60 planned participants and 55 of the 60 sampled participants were interviewed in stratum (iii). The three strata together generated a sample of 259 municipalities, of which 253 agreed to respond to the survey. Thus, sample losses corresponded to six municipalities and occurred due to refusal or inability to participate due to recent changes in management positions. The sample weights were calculated, and a weighted sample of 553 municipalities was obtained.

In Brazil, the family health strategy (ESF) model is similar to that of comprehensive PHC. Thus, in this article, we refer to ESF teams as comprehensive PHCs and traditional PHC teams as representatives of services with little investment in essential PHC attributes. Given that municipalities tend to display heterogeneous patterns of

PHC organization [23], the study employed a gradative analytical approach, classifying municipal PHC according to its degree of convergence with essential attributes, rather than relying on a dichotomous categorization of "pure" PHC types (comprehensive or traditional).

Data collection

Data were collected from February to June 2022 through telephone or video call surveys. An ad hoc questionnaire (supplementary files) was designed to capture specific regional nuances. Its content and face validity were established through a consensus process involving academic experts from UNESP and health managers from the State Health Secretariat and COSEMS-SP, followed by a pilot test to ensure the clarity and appropriateness of the items. The form was structured on the RedCap platform and organized into seven blocks: (i) PHC model; (ii) general characteristics of PHC management in the municipality; (iii) initial adaptation to the pandemic context; (iv) COVID-19 health actions (2020 and 2021); (v) continuity of PHC activities (2020 and 2021); (vi) general impressions; and (vii) successful experiences during the pandemic. The characterization of the previous PHC structure based on essential attributes was concentrated in blocks (i) and (ii); the organization of services in a health crisis was represented based on the response to COVID-19, blocks (iii) and (iv); and care continuity, blocks (v), (vi) and (vii). During questionnaire administration, the initial contact for the interview was the municipal health secretary. After being informed about the study objectives and the topics covered in the interview, the secretary could either respond directly or designate another official—such as the PHC coordinator, the health director, or a professional in a comparable position—to respond.

Variables

Based on the questions in the questionnaire (available in the Supplementary material), indicators were developed to characterize the degree of convergence between Primary Health Care (PHC) and its essential attributes—longitudinality, first-contact access, comprehensiveness, and care coordination—at the municipal level, following the Family Health Strategy (ESF) model [3, 23, 24]. Additionally, indicators were created to assess performance in maintaining continuity of care during the pandemic (Table 1).

Longitudinality, defined as the sustained therapeutic bond with the same PHC team or professional over time, was mapped using question 6, and described in Table 1, line 3, as "Continuity of care by the same team".

First-contact access was captured through "Guidance on access to PHC offered to users" (question 5 in questionnaire; line 2 in Table 1) and territorialization process

Table 1 Aspects considered for scoring the convergence score with the comprehensive PHC

Aspects	Score variation
Territorialization process	1 to 3
Guidance on access to PHC offered to users	2 to 3
Continuity of care by the same team	0 to 3
Medical care provided by a family doctor or general practitioner	0 to 3
Activities performed by community health workers	0 to 3
Available counter-referral flow between health services	1 to 3

Table 2 Aspects considered for scoring care continuity during the COVID-19 pandemic

Aspects	Score variation
Home visits	-1 to 3
Activities performed by PHC during home visits	0 to 3
Prenatal care appointments	-1 to 3
Activities performed by PHC during prenatal care appointments	1 to 3
Childcare	-1 to 3
Activities performed by PHC during childcare	1 to 3
Appointments for chronic diseases	-1 to 3
Activities performed by PHC during appointments for chronic diseases	1 to 3
Participants' self-assessment of their performance in providing care continuity for priority groups (pregnant women, children aged 0-2 years, and people with chronic diseases)	0 to 3

(questions 3 and 4 in questionnaire; line 1 in Table 1), referring to the geographic delimitation and the specific population under each team's responsibility. **Care coordination** was assessed through the available counter-referral flow between health services (question 10 in the questionnaire). The **comprehensiveness** indicator was constructed based on the existence of medical care provided by a family doctor or general practitioner and on the scope of activities performed by community health workers (questions 7 and 46 in the questionnaire; lines 4 and 5 in Table 1). Scoring was assigned according to the provided database [<https://doi.org/10.7910/DVN/KP7Y5A/>].

Work process changes to adapt to the current health crisis (COVID-19) were captured through question 37 (see the questionnaire in the supplementary material), related to technological improvements aimed at conducting telehealth appointments [10, 11] and telecare, and question 24, related to establishing the referral flow for patients with suspected or diagnosed COVID-19 within the PHC by establishing an exclusive COVID-19 PHC service or separating PHC units exclusively for COVID-19 care. Care continuity during the pandemic was assessed through nine dimensions, through questions 64a to 64 L (Table 2).

Based on the literature and guidelines for Primary Health Care (PHC), the authors established a scoring system for the managers' responses. This model was validated by five experts—professors and researchers in the field of Brazilian Collective Health from various institutions—with recognized expertise in the subject. Following the incorporation of the panel's contributions, the final scale was defined with variations from 0 to 3 for convergence with comprehensive PHC, and from -1 to 3 for continuity of care.

In addition to the variables in the questionnaire, the municipality's population, potential population coverage of Primary Health Care (PHC) teams and Family Health Strategy (FHS) teams, social indicators (longevity, schooling), and municipal financial capacity indicators (total per capita health expenditure, per capita tax revenue, per capita SUS transfer revenue, percentage of own resources allocated to health, municipal wealth), were added to the analysis.

Municipal population data were obtained from the State Health Secretariat website, using the 2021 population estimate calculated by the Fundação SEADE based on projections from the 2022 Census.

The potential coverage of PHC and FHS teams was retrieved from the Ministry of Health's PHC website [25], which has information on the number of funded Family Health and PHC teams, considering the potential population served by the team (data referring to the registration status in August 2021).

Longevity, schooling, and municipality's wealth indicators were obtained from the Fundação SEADE website (<http://iprs.seade.gov.br/>), for the year 2018. And, the municipality's financial capacity indicators were obtained from the Public Health Budget Information System (SIOPS), for the year 2022 (<http://siops-asp.datasus.gov.br/cgi/siops/serhist/MUNICIPIO/indicadores.HTM>).

Initially, a correlation analysis was performed between all variables using a correlation matrix and Pearson's correlation coefficient. The initial results of this analysis revealed collinearity between PHC coverage and FHS coverage; the latter was excluded from the model, as PHC coverage showed a stronger correlation coefficient with the dependent variable.

Thus, the variables included in the study were named as follows:

- Care continuity in PHC:** PHC care continuity score;
- Comprehensive PHC:** Score of the convergence score with comprehensive PHC;
- Investment in telecare:** Investment in telecare score in PHC;
- PHC with flow for RS:** Separate care flows for patients with respiratory symptoms (RS) within the PHC unit;

Establishing an exclusive COVID-19 service:

Creating a new service to provide COVID-19 care;

Exclusive PHC COVID-19 services: Transforming a PHC service to operate as a dedicated COVID-19 care center;

Contractualized PHC management: presence of a management contract with non-governmental entities for PHC;

Population: Number of inhabitants in the municipality.

PHC coverage: Population coverage by PHC and FHS teams;

FHS coverage: Population coverage by FHS teams;

Longevity: a combination of four mortality rates for specific age groups: perinatal (fetuses and children from zero to six days); infant (from zero to one year); individuals aged 15 to 39 years; and individuals aged 60 to 69 years.

Schooling: school attendance rate for the 0- to 3-year age group;

Municipal wealth: calculated from indicators of electricity consumption in agriculture, commerce, and services, per capita GDP, and family income;

Per capita total health expenditure: SIOPS indicator for 2022;

Per capita tax revenue: SIOPS indicator for 2022;

Per capita SUS transfer revenue: SIOPS indicator for 2022;

Percentage of own municipality resources allocated to health: SIOPS indicator for 2022.

Data analysis

All the analyses were weighted on the basis of the sampling weights defined in the sampling process. The data analysis model considered care continuity in PHC as the dependent variable. Pearson's correlation coefficient, which is based on a correlation matrix, initially measures the dependence between variables. Multiple linear regression analysis (stepwise method) was subsequently performed with all the variables of interest. A logarithmic transformation was performed to achieve a normal distribution of the population variables. The data were analysed via the SPSS™ statistical package version 20, assuming a statistical significance level of 5%.

Ethics approval and consent to participate

This study was conducted in accordance with the guidelines of the Brazilian current ethical standards and with the approval of the Ethics Committee of the Health Institute, under opinion number 5,317,019; CAAE: 48513721.8.3001.0086. All participants provided informed consent before their involvement in the study.

Results

The following section presents the descriptive and analytical results, focusing on the associations between continuity of care, convergence with essential PHC attributes, local characteristics, and municipal organizational strategies implemented during the pandemic.

Table 3 shows a summary description of the variables included in this study per care continuity in PHC. In this table, we can observe a consistent association between care continuity in PHC and the variables of PHC convergence ($r=0.45$), and telecare initiatives ($r=0.30$). Other variables also showed significant positive correlations, albeit of lesser intensity: PHC with flow for SR, contractualized PHC management, PHC coverage, total per capita health expenditure, and per capita SUS transfer revenue. Note that the exclusive COVID PHC service and longevity also exhibited significant correlations, but with negative values.

Notable correlations among the included variables are also highlighted: population was inversely correlated with PHC coverage, FHS coverage, per capita tax revenue, and total per capita health expenditure; PHC and FHS coverages were positively correlated with per capita SUS transfer revenue and total per capita health expenditure. Finally, the strong correlation between PHC and FHS coverages indicates collinearity.

A Pearson correlation matrix is shown in Table 3, including all the variables selected for the study. Initially, we underscore the correlation between care continuity in PHC and PHC convergence in comprehensive PHC ($r=0.453$, $p=0.000$). Other variables were also significantly correlated but with less intensity: UBS transformation ($r=-0.109$, $p=0.011$), investment in telecare ($r=0.295$, $p=0.000$), separate care flow in UBS for patients with respiratory symptoms ($r=0.110$, $p=0.009$), and PHC coverage ($r=0.128$, $p=0.009$).

Table 4 shows the results of the multiple linear regression analysis, where care continuity in PHC was considered the dependent variable. In this model, convergence with the attributes of Integral PHC, investment in teleconsultation, and total per capita health expenditure showed significant β values, with respective positive coefficients of 0.374, 0.210, and 0.278. It is noteworthy that the largest β was that of Integral PHC.

However, the exclusive COVID PHC service, per capita tax revenue, and creation of a COVID center exhibited negative β values of -0.112, -0.200, and -0.078, respectively.

Discussion

This study analysed PHC's capacity to maintain routine health actions during a health crisis, such as the COVID-19 pandemic. We should discuss PHC organization in this context of crisis because system overload at all

Table 3 Correlation Matrix (Pearson correlation) between the variables included in the model, State of São Paulo, 2022

Variable	Care continuity in PHC	Comprehensive PHC	Investment in telecare	PHC flow for RS	Establishing an exclusive COVID-19 service	Exclusive PHC COVID-19 services	Contractualized PHC management	Population (Ln)	PHC coverage	FHC coverage	Longevity	Schooling	Municipal wealth	Per capita total health expenditure	Per capita tax revenue	Per capita SUS transfer revenue	Percentage of own municipality resources allocated to health
Care continuity in PHC	1																
Comprehensive PHC	0.453**	1															
Investment in telecare	0.295**	0.268**	1														
PHC with flow for RS	0.110*	0.086*	0.166**	1													
Establishing an exclusive COVID-19 service	-0.010	0.071	0.166**	-0.105*	1												
Exclusive PHC COVID-19 services	-0.109*	0.018	0.082	-0.025	0.067	1											
Contractualized PHC management	0.132*	0.232**	0.078	0.109*	0.075	-0.069	1										
Population (Ln)	0.046	0.113**	0.208**	0.218**	0.066	0.053	0.218**	1									
PHC coverage	0.095*	0.138**	-0.094*	-0.0715**	-0.066	-0.054	-0.715**	1									
FHC coverage	0.095*	0.150**	-0.138**	0.903**	0.056	0.903**	0.903**	0.903**	1								
Longevity	-0.098*	-0.077	-0.152**	-0.072	-0.029	0.066	-0.072	0.012	0.005	1							
Schooling	-0.017	0.014	0.040	0.160**	0.105*	0.160**	0.160**	0.160**	0.160**	0.160**	1						
Municipal wealth	0.006	0.010	0.032	0.198**	-0.059	0.198**	0.198**	0.198**	0.198**	0.198**	0.198**	1					
Per capita total health expenditure	0.139**	0.036	-0.064	0.112**	-0.048	0.100*	-0.454**	0.485**	0.485**	0.485**	0.130**	0.279**	1				
Per capita tax revenue	0.010	-0.045	-0.107*	0.056	-0.010	-0.049	-0.555**	0.460**	0.460**	0.460**	0.180**	0.332**	0.175**	1			
Per capita SUS transfer revenue	0.102*	0.047	-0.090*	0.163**	-0.057	0.056	-0.426**	0.517**	0.517**	0.517**	0.092*	0.453**	0.453**	0.453**	1		
Percentage of own municipality resources allocated to health	-0.004	0.023	-0.010	0.033	0.147**	0.028	0.089*	0.206**	-0.169**	-0.104*	-0.164**	0.059	-0.018	-0.262**	-0.152**	1	

*correlation is significant at the 0.05 level

**correlation is significant at the 0.01 level

Table 4 Multiple linear regression between care continuity and associated variables. State of São Paulo, 2022

Variables	Coefficients		
	95,0% Confidence Interval for B	β (Standardized)	Sig.
Constant	16.450 - 25.868		0.000
Comprehensive PHC attributes	1.253 - 1.885	0.374	0.000
Investment in virtual care in PHC	0.975 - 2.087	0.210	0.000
Per capita total health expenditure	0.003 - 0.008	0.278	0.000
Exclusive PHC COVID-19 services	-6.234 - -1.339	-0.112	0.002
Per capita tax revenue	-0.002 - 0.000	-0.200	0.002
Establishing an exclusive COVID-19 service	-5.707 - -0.034	-0.078	0.047

care levels has challenged the reorganization of routine appointments and preservation of care for other health problems during the pandemic [10, 12, 16].

We analysed attributes in the organization of actions in PHC to assess its potential as a comprehensive PHC. We also considered some new strategies adopted by the municipality to address COVID-19, such as PHC telecare and transforming one or more PHC services into an exclusive COVID-19 care service. Similarly, the analysis included the municipality's attributes that might have influenced the local response during the pandemic.

The analysis of convergence with comprehensive Primary Health Care (PHC) indicates that the essential attributes of PHC (longitudinality, comprehensiveness, bonding, first contact accessibility, and coordination of care) are present within the Brazilian system, albeit with varying degrees of convergence. Therefore, the case study illustrates the possibility of utilizing the prior structure and organizational aspects of PHC team workflows as pre-pandemic variables to analyze the influence of comprehensive PHC on the system's response at this level of care during the health crisis.

The results showed that PHC's ability to maintain care continuity depended on an organizational model prioritizing comprehensive care, on health funds effectively allocated [39], and on municipal strategies for investing in PHC telecare [1, 10]. The implementation of telemedicine can be understood as a facilitator for establishing bonds of trust that encourage the use of PHC as the point of first contact. Furthermore, it provides working conditions aligned with the PHC attributes of longitudinality, comprehensiveness, and coordination. Thus, telemedicine may corroborate the attributes of convergence with comprehensive PHC and, together, become key factors in promoting continuous care even during health crises [24, 30, 38].

The population coverage of PHC teams, despite showing a positive correlation in the initial univariate analysis, lost significance in the multivariate analysis, not proving to be a factor that enhanced an adequate response to the pandemic situation, as observed in another study [24]. In the national setting, in pre-pandemic context, the associations between a well-established PHC system with good population coverage and health outcomes for these populations are already known [36–38]. Nevertheless, the state of São Paulo has shown low PHC coverage indicators over the last few decades compared with other federated units [23, 26, 39], with significant regional differences. And it can explain the results.

Total health expenditure per capita was also associated with continuity of care in PHC. However, this requires further analysis as it may be linked to population size. Smaller municipalities showed higher spending compared to larger ones, suggesting that in small towns, health resources are more focused on PHC due to the lack of medium and high-complexity infrastructure, which is typically concentrated in larger, regional hubs [39].

Due to its broader nature and its stronger alignment with the model of care, converging to comprehensive PHC was more strongly associated with care continuity than were the other variables analysed. Thus, it should gain prominence in discussions on strengthening health systems.

On the other hand, the association between care continuity and establishing exclusive COVID-19 PHC services was negative. Although these COVID units have gained prominence in the pandemic response organization, under the arguments of containing transmission risks and that separating the public served between services could seemingly produce a relieving effect so that other PHC services, this hypothesis was not proven true.

Separating the target audience brought a rupture of the first access and comprehensiveness attributes, thus compromising longitudinality and, by extension, care continuity. Furthermore, separate flows can lead to the reallocation of flows and people, affecting interprofessional teamwork, which also tends to harm care continuity [21, 29, 34], whether within or outside the context of a health crisis.

Thus, São Paulo's data align with results from the rest of Brazil [18, 24, 30] and show the relevance of promoting comprehensive PHC and converging on this type of care organization to advance care longitudinality and territorialization, highlighted during the pandemic.

The results also reinforce the idea that it is crucial to reverse the scenario of changes promoted in health systems and PHC [31–35] to have health systems prepared for care continuity even during health crises, which tend to reduce financing and the scope of care and

can restrictively affect the scope of care offerings and threaten the consolidation of PHC's essential attributes.

Therefore, it indicates the need to invest in expanding and consolidating the attributes of comprehensive PHC, which promotes more comprehensive and integrated care [6, 27, 28, 30]. There is an urgent need to implement robust policies that support the expansion of PHC in terms of its essential attributes and that encourage adaptation and healthcare continuity at all care levels to ensure the efficiency and resilience of health systems.

Study limitations

Before concluding, these findings should be interpreted in light of the study's limitations. The study's limitation was its geographic scope, which covered only one Brazilian state. However, internal diversity minimizes this aspect, which affects municipalities of different population sizes and with different health service structures. It also limited the care continuity analysis to actions related to children and pregnant women of users with NCDs, as they represent priority groups in PHC. Nevertheless, the heterogeneity across municipalities and the comparative analysis of different PHC configurations provide useful evidence on how essential attributes and local organizational strategies were associated with continuity of care under crisis conditions. While the use of an ad hoc questionnaire is a limitation due to the lack of formal psychometric validation, this risk was mitigated by a rigorous content review involving academic researchers and stakeholders. This is compounded by the potential for response bias arising from variations in perspectives among the different actors interviewed; however, these individuals were specifically designated as key informants by the municipal health secretary to ensure expertise. Beyond organizational factors, this study did not account for individual professional characteristics—such as age, tenure, or training—which may influence care delivery and thus preclude a more granular analysis of individual-level variables. Another limitation of this study is that it does not explicitly account for municipal-level socioeconomic, cultural, and participatory differences between areas operating under different primary health care models, which may partially influence the observed outcomes. Finally, the study's cross-sectional nature prevents causal inferences, while the reliance on self-reported data from municipal managers introduces the possibility of bias influenced by social desirability.

Conclusion

The findings presented here align with efforts already established globally to “reference” lessons learned during the COVID-19 pandemic and show the relevance of resuming discussions on the guidelines that should guide comprehensive PHC and its role in public health policies

applicable to all health systems. This study reaffirms the relevance of comprehensive PHC, highlighting that its guidelines have been vital for territorialization, continuous access, and comprehensive care despite its variations. Furthermore, converging on the essential attributes of comprehensive PHC was especially crucial for care continuity. During the COVID-19 pandemic, the recovery of priority activities in PHC has shown that it is possible to maintain longitudinal actions such as prenatal care, childcare, home visits, and care for users with NCDs, even in municipalities with a smaller structure but with aspects linked to the essential attributes of comprehensive PHC.

In Brazil, municipal governance is strategic to the development of the essential attributes of comprehensive PHC that sustain continuity of care in times of crisis. Therefore, continued and robust investments in comprehensive PHC are needed to prepare the system, ensuring that health professionals deeply understand the living conditions of communities and develop a diverse range of skills and abilities. This strengthening is essential for ensuring the resilience and effectiveness of health systems in different contexts and structures. We recommend further studies detailing the implementation of PHC's essential attributes to guide health systems in implementing comprehensive PHC.

Abbreviations

PHC	Primary Health Care
UBS	Primary health care units
SUS	Brazilian Unified Health System
ESF	Family Health Strategy
RS	Respiratory Symptoms

Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s12875-026-03296-4>.

- Supplementary Material 1.
- Supplementary Material 2.
- Supplementary Material 3.
- Supplementary Material 4.

Acknowledgements

The authors thank Aparecida De Albuquerque Dantas for her excellent work in field organization and data collection, and Miriam Vaz Ferreira Neves for her administrative support to the research and financial management of the project.

Authors' contributions

All authors made significant contributions to the development of this study. Mônica Martins de Oliveira Viana coordinated the research and manuscript preparation. Mônica Martins de Oliveira Viana, Mariana Tarricone Garcia, Lígia Schiavon Duarte, Arnaldo Sala, Maria Izabel Sanches Costa, and Michelle Fernandez contributed to data collection, analysis, and article writing. Barbara Martins Pontes managed the data repository. All authors reviewed and approved the final version of the manuscript and accept responsibility for its content.

Funding

This work was funded by FESIMA - Health Secretariat - Government of the State of São Paulo (Brazil). The funding agency had no role in the conception, data collection, analysis, decision to publish, or manuscript preparation.

Data availability

The data described in this article can be freely and openly accessed at Harvard Dataverse: <https://doi.org/10.7910/DVN/KP7Y5A>.

Declarations

Ethics approval and consent to participate

This study was conducted in compliance with current ethical standards and with the approval of the Ethics Committee of the Health Institute, under opinion number 5,317,019; CAAE: 48513721.8.3001.0086. All participants provided informed consent before their involvement in the study.

Consent for publication

All authors confirm their awareness of and agreement with the submission and potential publication of this manuscript in *BMC Primary Care*. The parties involved, including collaborating and funding institutions, have approved the dissemination of results.

Competing interests

The authors declare no competing interests.

Received: 31 October 2024 / Accepted: 27 March 2026

Published online: 09 April 2026

References

1. Yaacoub S, Zmeter C, Abou Abbas L, Leresche E, Kdouh O, Hammoud R, et al. Has the COVID-19 pandemic changed the utilization and provision of essential health care services from 2019 to 2020 in the primary health care network in Lebanon? Results from a nationwide representative cross-sectional survey. *PLoS One*. 2023;18(7):e0288387. <https://doi.org/10.1371/journal.pone.0288387>.
2. Perry HB, Black RE, Taylor CE, Arole S, Bang A, Bhutta ZA, Chowdhury AMR, et al. Comprehensive review of the evidence regarding the effectiveness of community-based primary health care in improving maternal, neonatal, and child health: 8. Summary and recommendations of the Expert Panel. *J Glob Health*. 2017;7(1):010908. <https://doi.org/10.7189/jogh.07.010908>.
3. Starfield B. *Primary Care: balancing health needs, services, and technology*. New York: Oxford University Press; 1998. Revised edition. p.448. ISBN: 0 19 512543 6.
4. Fortin M, Pereira J, Hutchison B, Ramsden VR, Menear M, Snelgrove D. Nurturing a culture of curiosity in family medicine and primary care: The Section of Researchers' Blueprint 2 (2018–2023). *Can Fam Physician*. 2021;67(5):333–8. <https://doi.org/10.46747/cfp.6705333>.
5. Kruk ME, Gage AD, Arsenault C, Jordan K, Leslie HH, Roder-DeWan S, et al. High-quality health systems in the Sustainable Development Goals era: time for a revolution. *Lancet Glob Health*. 2018;6(11):e1196–252. [https://doi.org/10.1016/S2214-109X\(18\)30386-3](https://doi.org/10.1016/S2214-109X(18)30386-3).
6. Macinko J, Starfield B, Erinoshio T. The impact of primary healthcare on population health in low- and middle-income countries. *J Ambul Care Manage*. 2009;32(2):150–71. <https://doi.org/10.1097/JAC.0b013e3181994221>.
7. World Health Organization and United Nations Children's Fund. *A vision for primary health care in the 21st century: towards universal health coverage and the Sustainable Development Goals*. Geneva: World Health Organization; 2018.
8. Khalil-Khan A, Khan MA. The impact of COVID-19 on primary care: a scoping review. *Cureus*. 2023;15(1):e33241. <https://doi.org/10.7759/cureus.33241>. PMID: 36618499; PMCID: PMC9815485.
9. Mughal F, Khunti K, Mallen CD. The impact of COVID-19 on primary care: insights from the National Health Service (NHS) and future recommendations. *J Fam Med Prim Care*. 2021;10(12):4345–9. https://doi.org/10.4103/jfmpc.jfmpc_756_21.
10. Tu K, Sarkadi Kristiansson R, Gronsbell J, de Lusignan S, Flottorp S, Goh LH, et al. Changes in primary care visits arising from the COVID-19 pandemic: an international comparative study by the International Consortium of Primary Care Big Data Researchers (INTRePID). *BMJ Open*. 2022;12(5):e059130. <https://doi.org/10.1136/bmjopen-2021-059130>. PMID: 35534063; PMCID: PMC9086267.
11. Silva BRGD, Corrêa APV, Uehara SCDSA. Primary health care organization in the Covid-19 pandemic: scoping review. *Rev Saude Publica*. 2022;56:94. <https://doi.org/10.11606/s1518-8787.2022056004374>. PMID: 36383807; PMCID: PMC9635848.
12. Li D, Howe AC, Astier-Peña MP. Primary health care response in managing pandemics: learnings from the COVID-19 pandemic. *Aten Primaria*. 2021;53(Suppl 1):102226. <https://doi.org/10.1016/j.aprim.2021.102226>. PMID: 34961573; PMCID: PMC8708808.
13. World Health Organization. Operational considerations for case management of COVID-19 in health facility and community: interim guidance. <http://www.euro.who.int/en/health-topics/health-emergencies/coronavirus-covid-19/technical-guidance/2020/operational-considerations-for-case-management-of-covid19-in-health-facility-and-community-interimguidance-19-march-2020> (acessado em 11/ Mai/2024).
14. Kluge HHP, Wickramasinghe K, Rippin HL, Mendes R, Peters DH, Kontsevaya A. Prevention and control of noncommunicable diseases in the COVID-19 response. *Lancet*. 2020;395(10238):1678–80. [https://doi.org/10.1016/S0140-6736\(20\)31067-9](https://doi.org/10.1016/S0140-6736(20)31067-9).
15. Mendagudli RD, Kundapur R, Modi R. B. Primary Health Care and COVID-19 Pandemic. *ijhsir* [Internet]. 10Jun.2020 [cited 7Oct.2024];4(1):20–9. Available from: <https://ijhsir.ahsas-pgichd.org/index.php/ijhsir/article/view/84>
16. Grut M, de Wildt G, Clarke J, Greenfield S, Russell A. Primary health care during the COVID-19 pandemic: a qualitative exploration of the challenges and changes in practice experienced by GPs and GP trainees. *PLoS ONE*. 2023;18(2):e0280733. <https://doi.org/10.1371/journal.pone.0280733>. PMID: 36758002; PMCID: PMC9910752.
17. Viana MM, de O, Duarte LS, Escuder MML, Garcia MT, Fernandez M, Costa MIS, et al. Organização da Atenção Primária paulista no enfrentamento da COVID-19: análise segundo porte populacional. *Cienc Saude Colet*. 2023;28(12):3471–82. <https://doi.org/10.1590/1413-812320232812.09282023>.
18. Costa MIS, Rosa TEC, Lucena FS, Fernandez M, Duarte LS, Malinverni C, et al. Continuidade do cuidado e ações no território durante a COVID-19 em municípios de São Paulo, Brasil: barreiras e facilitadores. *Cienc Saude Colet*. 2023;28(12):3507–18. <https://doi.org/10.1590/1413-812320232812.06302023>.
19. Victora CG et al. Condições de saúde e inovações nas políticas de saúde no Brasil: o caminho a percorrer. *The Lancet*. 2011;90–102. Available from: <https://www.thelancet.com/pb/assets/raw/Lancet/pdfs/brazil/brazilpor6.pdf>
20. Evans PB, Rueschemeyer D, Skocpol T, editors. *Bringing the State Back In*. Cambridge: Cambridge University Press; 1985.
21. Noronha JC, Lima LD, Machado CV. O Sistema Único de Saúde – SUS. In: Giovanella L, Escorel S, Lobato LVC, Noronha JC, Carvalho AI, editors. *Políticas e Sistema de Saúde no Brasil*. 2nd ed. Rio de Janeiro: Fiocruz; 2012.
22. Instituto Brasileiro de Geografia e Estatística (IBGE). *Atualização dos Mapas Municipais e Áreas Territoriais de estados e Município*. Rio de Janeiro: IBGE; 2022 [cited 2026 Mar 30]. Available from: <https://www.ibge.gov.br/geociencias/organizacao-do-territorio/malhas-territoriais/15774-malhas.html?edicao=36516>.
23. Castanheira ERL, et al. Organização da atenção primária à saúde de municípios de São Paulo, Brasil: modelo de atenção e coerência com as diretrizes do Sistema Único de Saúde. *Cadernos Saude Publica*. 2024;40(2):PT099723. <https://doi.org/10.1590/0102-311XPT099723>.
24. Schenkman S, et al. Padrões de desempenho da atenção primária à saúde diante da COVID-19 no Brasil: características e contrastes. *Cadernos Saude Publica*. 2024;39(8):e00009123. <https://doi.org/10.1590/0102-311XPT009123>.
25. Ministério da Saúde. E-gestor Atenção Básica: financiamento da APS. Available from: <https://egestorab.saude.gov.br/gestaoaps/relFinanciamento.xhtml>
26. Secretaria de Estado da Saúde (SP). Informações de saúde: indicadores de saúde. Available from: <https://www.saude.sp.gov.br/ses/perfil/profissional-da-saude/informacoes-de-saude/tabnet-ses-indicadores-de-saude>
27. Soares DA, Kochergin CN, Mistro S, Macedo JCL, Carvalho VCH dos, de Oliveira S. MG. Atenção Primária à Saúde abrangente: análise a partir do trabalho das equipes de Saúde da Família frente às doenças crônicas. *Physis* [Internet]. 2024;34:e34015. Available from: <https://doi.org/10.1590/S0103-7331202434015pt>
28. Viacava F, et al. SUS: oferta, acesso e utilização de serviços de saúde nos últimos 30 anos. *Cienc Saude Colet*. 2018;23(6):1751–62. <https://doi.org/10.1590/1413-81232018236.06022018>.
29. Mayo AT. Teamwork in a pandemic: insights from management research. *BMJ Lead*. 2020;4:53–6. <https://doi.org/10.1136/LEADER-2020-000246>.

30. Engstrom E, Teixeira MB, Oliveira R, Vianna SM, Gonçalves AS. Recomendações para a organização da atenção primária à saúde no SUS no enfrentamento da Covid-19. *Observatório Covid-19: Série Linda de cuidado Covid-19 na Rede de Atenção à Saúde*. Rio de Janeiro: Fiocruz; 2020.
31. Cordilha AC, Lavinhas L. *Ciênc saúde coletiva*. 2018;23(7):2147–58. <https://doi.org/10.1590/1413-81232018237.11422018>. Transformações dos sistemas de saúde na era da financeirização. Lições da França e do Brasil.
32. Mathews M, Hedden L, Lukewich J, Hayes-McNeill T, Dorgan M. Adapting care provision in family practice during the COVID-19 pandemic: a qualitative study exploring the impact of primary care reforms in four Canadian regions. *BMC Prim Care*. 2024;25(1): 52. <https://doi.org/10.1186/s12875-024-02024-8>. PMID: PMC8923183.
33. Filippou J, Giovanella L, Konder M, Pollock AM. A liberalização do Serviço Nacional de Saúde da Inglaterra: trajetória e riscos para o direito à saúde. *Cadernos de saúde pública*. 2016;32(8):e00034716. <https://doi.org/10.1590/0102-311X00034716>.
34. Paim JS. Sistema Único de Saúde (SUS) aos 30 anos. *Ciênc saúde coletiva* [Internet]. 2018Jun;23(6):1723–8. Available from: <https://doi.org/10.1590/1413-81232018236.09172018>
35. de Brandão JR. M. A atenção primária à saúde no Canadá: realidade e desafios atuais. *Cad Saúde Pública* [Internet]. 2019;35(1):e00178217. Available from: <https://doi.org/10.1590/0102-311X00178217>
36. Giovanella L, Franco CM, Almeida PF. Política Nacional de Atenção Básica: para onde vamos? *Ciênc Saúde Coleta* [Internet]. 2020;25(4):1475–82. <https://doi.org/10.1590/1413-81232020254.01842020>
37. Macinko J, Mendonça CS. Estratégia Saúde da Família, um forte modelo de Atenção Primária à Saúde que traz resultados. *Saúde Debate*. 2018;42(Spec 1):18–37. <https://doi.org/10.1590/0103-11042018S102>.
38. Dumas RP, Silva GA, Tasca e, Leite R, Brasil I da, Greco P et al. DB. O papel da atenção primária na rede de atenção à saúde no Brasil: limites e possibilidades no enfrentamento da COVID-19. *Cad Saúde Pública* [Internet]. 2020;36(6):e00104120. Available from: <https://doi.org/10.1590/0102-311X00104120>
39. Duarte LS, Viana MM, de Scalco O, Garcia N, Felipe MT. LV. Incentivos financeiros para mudança de modelo na atenção básica dos municípios paulistas. *Saude soc* [Internet]. 2023;32(1):e210401pt. Available from: <https://doi.org/10.1590/S0104-12902023210401pt>
40. Brasil. Ministério da Saúde. e-Gestor Atenção Primária à Saúde - Relatórios APS - Cobertura Potencial da APS (2021 - atual). Available from: <https://egestorab.saude.gov.br/paginas/ acessoPublico/relatorios/relCoberturaAPSCadastroParamPnab.xhtml>

Publisher's note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.