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ORIGINAL ARTICLE

ORGANIZATION AND PERFORMANCE OF PRIMARY CARE DURING THE PANDEMIC: A CROSS-SECTIONAL STUDY BASED ON MUNICIPAL POPULATION SIZE

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ABSTRACT

Objective: to analyze the organization and care provided by Primary Health Care (PHC) for suspected or confirmed cases of COVID-19 in Brazilian municipalities, according to population size. **Methodology**: a cross-sectional, analytical, and exploratory approach, with 1,474 PHC managers responding to a questionnaire via Google Forms between April and September 2022. The analyzes used prevalence ratios and Poisson regression with random effects. **Results:** in small municipalities (sizes 1 and 2), the availability of face shields was 11% more prevalent (p<0.01), and the availability of testing facilities and staff was 8% higher (p=0.02) than in municipalities of size 3 or 4. In these locations, care in a separate ward was 35% more frequent (p<0.01), prior bed verification was 78% more common (p<0.01), and active surveillance was 28% higher (p<0.01). Symptom review every 48 hours was 52% more prevalent (p<0.01). On the other hand, the adoption of clinical protocols for flu-like syndromes was 9% lower (p=0.01). Medium-sized municipalities (3 and 4) had lower availability of aprons (p=0.03) and disinfection between visits (p<0.01), as well as worse follow-up indicators. Population size influenced the PHC response. which was more agile in small municipalities and more complex in large ones.

Keywords: COVID-19. Primary health care. Public health surveillance. Health management. Demography.

INTRODUCTION

The *Coronavirus Disease 2019* (COVID-19) pandemic, which had already infected over 93 million people and caused around 2 million deaths globally by January 2021[1], has put healthcare systems around the world under unprecedented pressure. In this scenario, the role of Primary Health Care (PHC) has become fundamental. In the local context, it was responsible for early identification of COVID-19 cases, monitoring mild cases, and appropriately referring severe cases to more complex services[2]. Thus, the pandemic context required robust coordination of care and care flows across the Health Care Network (RAS)[3].

However, due to the organizational heterogeneity of local services, mainly driven by regional differences across the country, difficulties were observed in coordinating surveillance and PHC actions, in addition to a lack of federal coordination[3]. Meanwhile, countries such as China successfully integrated PHC into national surveillance activities, including testing, contact tracing, and quarantine[4]. However, the Brazilian reality was characterized by fragmented actions that hindered coordination between health surveillance and territorial actions[3].

Considering this reality, to ensure the efficient provision of services at this level of care, planning based on the epidemiological scenario of COVID-19 became essential, as well as continuous and in a way that includes monitoring, evaluation, and reorganization of the RAS, considering the unique characteristics and local epidemiological evidence[2,3].

During the pandemic, PHC adapted to the demands of this new scenario by incorporating health information technologies, expanding consultations via telephone and video calls[5]. In

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this context, countries adopted different strategies to reorganize PHC services and meet population needs. In general, the reorganization of PHC services focused on health surveillance actions to reduce the spread of the *Severe Acute Respiratory Syndrome Coronavirus 2* (SARS-CoV-2) virus in the territories, in addition to continuing community health promotion and prevention activities[3-4].

Before the pandemic, data from 2019 show that more than half of Brazilian municipalities had 100% PHC coverage, while larger municipalities had lower coverage of this level of care[6]. When analyzing the weaknesses in large municipalities in the period preceding the pandemic, during the process of implementing and expanding PHC programs, there were already difficulties regarding user enrollment, in addition to the expansion of the Family Health Strategy (FHS) and a lack of understanding of this level of care as the gateway to the health system[7-8].

The pandemic, therefore, acted as a revealing factor for these inequalities; in other words, smaller municipalities, with more delimited territories and less complex networks, often performed better by centralizing actions in PHC, using it for case monitoring, educational campaigns, and, subsequently, vaccination. In contrast, large urban centers, although essential as a reference for highly complex care, provided more fragmented care in PHC, exposing the disconnect between levels of care[8].

Given this scenario, the existing literature has already documented local experiences of PHC reorganization during the crisis[3,5,8]. However, there remains a key research gap in understanding which factors, beyond the political and organizational dimensions, influenced service adaptability. Variables such as population size, the Municipal Human Development Index (MHDI), and the configuration of PHC services themselves in the performance of PHC against the COVID-19 pandemic lack systematic comparative analysis. Thus, this study aims to analyze and compare the organization and care provided by PHCs to people with suspected and/or diagnosed COVID-19 across Brazilian municipalities, while accounting for population size.

METHOD

This is a cross-sectional, analytical, and exploratory study. The study was designed and reported in accordance with the recommendations of the *Strengthening the Reporting of Observational Studies in Epidemiology* (STROBE) initiative.

The study's target population consisted of all PHC service managers in Brazil. The sample was established for convenience, given the absence of official data on the total number of managers. A total of 1,474 PHC health service managers from Brazilian municipalities participated in the study.

To participate in the survey, the inclusion criterion was to be a PHC health service manager in the municipality for at least 3 months during the COVID-19 pandemic. Those on leave or vacation during the pandemic were not eligible to participate. Participants who did not complete the questionnaire were excluded.

To analyze and compare the size of municipalities, we used the 2017 population size classification of the Brazilian Institute of Geography and Statistics[9], namely: size 1: up to 5,000 inhabitants; size 2: 5,001 to 10,000 inhabitants; size 3: 10,001 to 20,000 inhabitants; size 4: 20,001 to 50,000 inhabitants; size 5: 50,001 to 100,000 inhabitants; size 6: 100,001 to 500,000 inhabitants; and size 7: more than 500,000 inhabitants.

Data Sources and Measurement

Data collection took place between April and September 2022. The collection tool was an online questionnaire completed by respondents themselves via Google Forms, based on the Ministry of Health's "Protocol for the Clinical Management of Coronavirus (COVID-19) in Primary Health Care," version 9[10]. The questionnaire was sent by email to municipal health departments, which then forwarded it to the managers of the municipality's PHC services.

To help reach the target audience, the survey was also disseminated to the National Council of Health Secretaries and the National Council of Municipal Health Secretaries, which emphasized the importance of municipal participation and forwarded the instrument to municipal health departments. Supporters of the Council of Municipal Health Secretaries (COSEMS) also collaborated in disseminating the survey to the Regional Health Departments (RHD).

The variables analyzed were identification of suspected cases of influenza-like illness and COVID-19; measures to prevent contagion in health facilities; stratification of the severity of influenza-like illness; therapeutic management and home isolation of mild cases; early diagnosis and referral to urgent/emergency services or hospitals for severe cases; immediate notification; clinical monitoring; community prevention measures; and support for active surveillance.

In the analyzes of the results, the data were initially described using absolute and percentage frequencies (qualitative variables) and measures such as mean, standard deviation, minimum, median, and maximum (quantitative variables). To estimate prevalence ratios (PRs) comparing HDI ranges and population sizes, a random-effects Poisson regression model was used. The modified Poisson model is recognized in the statistical literature as an appropriate approach to account for unobserved correlation or variability inherent in grouped data (by municipality), adjusting for intragroup correlation [11]. All analyses were performed using SAS 9.4 software. For all analyzes, a significance level of 5% (p-value less than 0.05) was adopted.

This research followed the guidelines and standards contained in Resolutions No. 466/2012 and No. 510/2016 of the National Health Council and was approved by the Research Ethics Committee of the Federal University of São Carlos (CAAE 52527521.8.0000.5504). All participants signed the Free and Informed Consent Form (FICF), available on the first page of the electronic form. Without FICF consent, it was not possible to access the data collection instrument.

RESULTS

A total of 1,474 PHC managers from municipalities across the country participated in the survey, with 676 (45.9%) from the Southeast Region, 21% (311) from the Northeast, 17.5% (258) from the South, 11.7% (173) from the Midwest, and 3.8% (56) from the North. In terms of population size, 350 (23.7%) were size 6, 325 (22%) were size 7, 194 (13.2%) were size 4, 179 (12.1%) were size 3, 175 (11.9%) were size 5, 147 (9.97%) were size 1, and 104 (7.1%) were size 2. Furthermore, 86.6% (1,276) of managers reported being female and 13.4% (198) male, with a mean age of 38.9 years (SD = 8.49).

For contagion prevention measures adopted specifically in triage, the provision of respiratory hygiene supplies/cough etiquette was 24% more prevalent (p=0.01) in municipalities of size 1 or 2 than in those of size 3 or 4; and the disinfection of instruments and equipment used in screening from one patient to another was 8% higher (p<0.01) in size 3 or 4 than in sizes 5, 6, or 7 (Table 1).

Table 1. Comparison between municipalities according to population size, regarding the adoption of measures to prevent contagion in patient screening. São Carlos-SP, 2022

Variable	Comparisons					
	Size 1 or 2 *vs* Size 3 or 4		**Size 1 or 2 *vs*Size 5, 6 or 7**		**Size 3 or 4 *vs* Size 5, 6 or 7**	
	PR (95% CI)*	**P-value**	**PR (95% CI)**	**P-value**	**PR (95% CI)**	**P-value**
Considering the possibility that the patient (and companion) may be infected with COVID-19, are there measures in place to prevent contagion at the healthcare facility where you work, specifically in the triage area?						
No	-	-	-	-	-	-
Yes	1,01 (1; 1)	0,02	1,02 (1,01; 1)	<0,01	1 (0,99; 1)	0,70
If contagion prevention measures are used in screening, indicate which ones:						
- Well-ventilated environment.	1,03 (0,94; 1)	0,50	1,06 (0,97; 1)	0,20	1,03 (0,94; 1)	0,53
- Care is provided to one patient at a time.	0,99 (0,95; 1)	0,53	1 (0,96; 1)	0,98	1,01 (0,98; 1)	0,37
- The instruments and equipment used in screening are disinfected and cleaned between patients.	1,02 (0,97; 1)	0,43	1,1 (1,04; 1)	<0,01	1,08 (1,02; 1)	<0,01
-Respiratory hygiene supplies/cough etiquette are provided.	1,24 (1,04; 1)	0,01	1,16 (0,98; 1)	0,08	0,93 (0,79; 1)	0,39

- Guidance on respiratory hygiene/cough etiquette is provided.	1,06 (0,95; 1)	0,32	1 (0,91; 1)	0,94	0,95 (0,86; 1)	0,28
- The trash cans are pedal-operated, so there is no need for manual handling.	1,09 (1; 1)	0,06	1,04 (0,96; 1)	0,35	0,95 (0,88; 1)	0,25
Are patients who present symptoms similar to those of COVID-19 after screening directed to a separate care ward from other patients?						
No	-	-	-	-	-	-
Yes	1,09 (1,02; 1)	0,01	1,05 (0,98; 1)	0,18	0,96 (0,89; 1)	0,29
Is the waiting room for patients with symptoms similar to those of COVID-19 separate from other patients?						
No	-	-		-	-	-
Yes	1,14 (1,06; 1)	<0,01	1,05 (0,99; 1)	0,13	0,93 (0,85; 1)	0,07

Note: * PR(95% CI): Prevalence Ratio with a 95% Confidence Interval; **More than one response per respondent is possible.

In comparisons between municipalities of size 1 or 2 and those of size 3 or 4, the availability of separate wards for patients with symptoms resembling to COVID-19 was 9% higher (p=0.01) in municipalities of size 1 or 2; A similar finding was observed in the availability of separate waiting rooms for patients with symptoms resembling to COVID-19, which was 14% (p<0.01) higher in municipalities of size 1 or 2 (Table 1).

In comparisons between municipalities of size 1 or 2 and those of size 3 or 4, the notification of suspected/confirmed cases of COVID-19 was 5% higher (p=0.02) in those of size 1 or 2; COVID-19 diagnosis was also 16% higher (p<0.01) in municipalities of size 1 or 2, and laboratory diagnosis was 34% (p<0.01) higher in these municipalities (Table 2).

Table 2. Comparisons between municipalities, according to population size, regarding the notification of suspected/confirmed cases of COVID-19, diagnosis, availability of protocols for classification, and telecare. São Carlos-SP, 2022

Variable	Comparisons					
	Size 1 or 2 vs Size 3 or 4		Size 1 or 2 vs Size 5, 6 or 7		Size 3 or 4 vs Size 5, 6 or 7	
	PR (95% CI)*	P-value	PR (95% CI)*	P-value	PR (95% CI)*	P-value
Does the Health Unit report all confirmed and suspected COVID-19 cases?						
No	-	-	-	-	-	-
Yes	1.05 (1.01; 1)	0.02	1.02 (0.99; 1)	0.16	0.98 (0.94; 1)	0.25
Does the health center perform COVID-19 testing?						
No	-	-	-	-	-	-
Yes	1.16 (1.06; 1)	<0.01	1.1 (1.01; 1)	0.03	0.95 (0.85; 1)	0.34
*If so, how is it done?***						
- Clinical-epidemiological diagnosis	0.98 (0.76; 1)	0.87	1.03 (0.79; 1)	0.82	1.05 (0.81; 1)	0.70
- RT-PCR laboratory diagnosis	1.34 (1.07; 2)	<0.01	1.16 (0.9; 1)	0.25	0.86 (0.64; 1)	0.33
- Diagnosis by rapid test and clinical-epidemiological diagnosis	1.08 (0.99; 1)	0.07	1.1 (0.96; 1)	0.17	1.01 (0.88; 1)	0.88
Is there a protocol in PHCfor classifying suspected cases as flu-like syndrome or severe acute respiratory syndrome?						
No	-	-	-	-	-	-
Yes	0.97 (0.91; 1)	0.45	0.91 (0.85; 1)	0.01	0.94 (0.88; 1)	0.04
Did the health unit provide telephone support to monitor mild COVID-19 cases?						
No	-	-	-	-	-	-
Yes	1.05 (0.95; 1)	0.33	1.13 (0.99; 1)	0.07	1.08 (0.94; 1)	0.27

Note: * PR(95% CI): Prevalence Ratio with a 95% Confidence Interval; **More than one response per respondent is possible.

When comparisons were made between municipalities of size 1 or 2 and those of size 5, 6, or 7, only the availability of protocols for classifying influenza-like illness and severe acute respiratory syndrome (SARS) showed a statistically significant difference, with a 9% lower prevalence (p=0.01) in municipalities of size 1 or 2. For this same variable, the availability of protocols was 6% lower (p=0.04) in municipalities of sizes 3 or 4 than in those of sizes 5, 6, or 7 (Table 2).

Regarding the type of personal protective equipment (PPE) available to professionals, protective eyewear was 8% more prevalent (p=0.01), and face shields were 11% more prevalent (p<0.01) in municipalities of sizes 1 or 2, compared with those of sizes 3 or 4. Face shields were also 8% more prevalent (p<0.01) in municipalities of size 1 or 2, when compared to those of size 5, 6, and 7. The availability of aprons was 4% less frequent (p=0.03) in municipalities of sizes 3 or 4 than in those of sizes 5, 6, and 7 (Table 3).

Table 3. Comparison between municipalities, according to population size, regarding the provision of PPE and training on its use for professionals and the presence of functioning alcohol gel dispensers. São Carlos-SP, 2022

Variable	Comparisons					
	Size 1 or 2 *vs* Size 3 or 4		**Size 1 or 2 *vs*Size 5, 6 or 7**		**Size 3 or 4 *vs* Size 5, 6 or 7**	
	PR (95% CI)*	**P-value**	**PR (95% CI)**	**P-value**	**PR (95% CI)**	**P-value**
Does the Health Unit provide PPE for professionals?						
No	-	-	-	-	-	-
Yes	1 (1; 1)	-	1 (1; 1)	0.15	1 (1; 1)	0.15
If yes to the previous question, which ones?						
- Procedure gloves	1.01 (1; 1)	0.06	1.01 (1; 1)	<0.01	1 (0.99; 1)	0.64
- Apron	1.04 (1; 1)	0.08	1 (0.97; 1)	0.80	0.96 (0.93; 1)	0.03
- Goggles	1.08 (1.02; 1)	0.01	1.05 (0.98; 1)	0.14	0.97 (0.9; 1)	0.44
- Surgicalmask	1.02 (0.99; 1)	0.15	1 (0.98; 1)	0.82	0.98 (0.95; 1)	0.14
- PFF2 (N-95) mask	1.05 (0.99; 1)	0.11	1.03 (0.97; 1)	0.34	0.99 (0.92; 1)	0.70
- Disposable cap	1.06 (1.01; 1)	0.01	1.02 (0.99; 1)	0.25	0.96 (0.92; 1)	0.06
- Face shield	1.11 (1.06; 1)	<0.01	1.08 (1.03; 1)	<0.01	0.98 (0.92; 1)	0.42
Did the health unit's staff receive training on care procedures and the use of PPE in relation to COVID-19?						
No	-	-	-	-	-	-
Yes	0.99 (0.93; 1)	0.83	0.97 (0.9; 1)	0.38	0.98 (0.92; 1)	0.45
Há dispensador de álcool em gel funcionante?						
No	-	-	-	-	-	-
Yes	1.05 (1.01; 1)	0.01	1.05 (1.01; 1)	<0.01	1 (0.96; 1)	0.89

Note: * PR(95% CI): Prevalence Ratio with a 95% Confidence Interval; **More than one response per respondent is possible.

The availability of functioning alcohol gel dispensers was 5% higher in municipalities of sizes 1 and 2 than in those of sizes 3 and 4 (p=0.01) and sizes 5, 6, and 7 (p<0.01) (Table 3).

Regarding the presence of facilities and trained staff to perform COVID-19 testing, municipalities of size 1 or 2 had an 8% higher prevalence (p=0.02) than municipalities of size 3 or 4, and an 11% higher prevalence (p<0.01) than municipalities of size 5, 6, or 7. A similar result was evident when assessing whether there were conditions to treat patients with suspected or diagnosed COVID-19 in a separate ward from other patients, as this was also more prevalent in municipalities of size 1 or 2, being 35% higher (p<0.01) when compared to those of size 3 or 4 and 28% higher (p<0.01) when compared to those of size 5, 6, or 7 (Table 4).

Table 4. Comparison between municipalities, according to population size, in terms of physical and human infrastructure, care conditions, and monitoring of COVID-19 cases in PHC. São Carlos-SP, 2022

Variable	Comparisons					
	Size 1 or 2 *vs* Size 3 or 4		Size 1 or 2 *vs* Size 5, 6 or 7		Size 3 or 4 *vs* Size 5, 6 or 7	
	PR (95% CI)*	P-value	PR(95% CI)	P-value	PR(95% CI)	P-value
Is there a structure and trained staff in place to carry out COVID-19 testing?						
No	-	-	-	-	-	-
Yes	1.08 (1.02; 1)	0.02	1.11 (1.03; 1)	<0.01	1.03 (0.94; 1)	0.54
Are there conditions to treat patients with suspected or diagnosed COVID-19 in a separate ward from other patients?						
No	-	-	-	-	-	-
Yes	1.35 (1.21; 2)	<0.01	1.28 (1.11; 1)	<0.01	0.95 (0.8; 1)	0.50
Does the health unit check whether the referral hospital for COVID-19 hospitalizations has enough beds available to admit patients who need hospitalization before referring them?						
No	-	-	-	-	-	-
Yes	1.21 (1.11; 1)	<0.01	1.78 (1.51; 2)	<0.01	1.46 (1.24; 2)	<0.01
Does the health facility provide the necessary guidance for patients entering home isolation?						
No	-	-	-	-	-	-
Yes	1.02 (1.01; 1)	<0.01	1.01 (1.01; 1)	<0.01	0.99 (0.98; 1)	0.40
Does the health facility conduct active, continuous surveillance of patients receiving follow-up care?						
No	-	-	-	-	-	-
Yes	1.09 (1.02; 1)	0.01	1.28 (1.15; 1)	<0.01	1.18 (1.05; 1)	<0.01
Does the health unit review symptoms and monitor the patient's progress every 48 hours, preferably by telephone, requesting an in-person consultation when necessary for a physical examination?						
No	-	-	-	-	-	-
Yes	1.11 (1.02; 1)	0.02	1.52 (1.3; 2)	<0.01	1.37 (1.17; 2)	<0.01

Note: * PR(95% CI): PrevalenceRatiowith a 95% Confidence Interval.

Checking bed availability before referring patients requiring hospitalization to a referral hospital was more common in municipalities of size 1 or 2, being 21% higher (p<0.01) when compared to those of size 3 or 4 and 78% higher (p<0.01) when compared to those of size 5, 6, and 7. When comparing municipalities of sizes 3 or 4 with those of sizes 5, 6, and 7, this prevalence was 46% higher (p<0.01) in municipalities of sizes 3 or 4 (Table 4).

Regarding care guidelines for patients who go into home isolation, this was 2% higher (p<0.01) in municipalities of sizes 1 or 2 compared with those of sizes 3 or 4 (Table 4).

Regarding active, continuous monitoring of patients receiving follow-up care, this was always more prevalent in municipalities of sizes 1 or 2. Compared with size 3 or 4 towns, it was 9% higher (p=0.01), and compared with size 5, 6, and 7 municipalities, it was 28% higher (p<0.01). When comparing municipalities of sizes 3 or 4 with those of sizes 5, 6, and 7, the difference was 18% higher (p<0.01) in municipalities of sizes 3 or 4 (Table 4).

As for reviewing symptoms and monitoring the evolution of the condition every 48 hours, preferably by telephone, requesting an in-person consultation when a physical examination was necessary, this was also more prevalent in municipalities of size 1 or 2, and in comparison with those of size 3 or 4, it was 11% more prevalent (p=0.02). With those of size 5, 6, and 7, it was 52% more prevalent (p<0.01). However, this prevalence was 37% higher (p<0.01) in municipalities of sizes 3 or 4 compared with those of sizes 5, 6, and 7 (Table 4).

DISCUSSION

The results of this study indicate significant differences in the response of Brazilian municipalities to the COVID-19 pandemic depending on population size. In small municipalities, infection prevention measures were more widely implemented in screening and care for symptomatic patients, and there was a higher prevalence of case reporting and diagnosis. On the other hand, these municipalities had fewer protocols for classifying flu-like symptoms and SARS. In contrast, large municipalities had greater availability of these protocols, whereas

monitoring and follow-up of patients with COVID-19 were more effective in small municipalities.

The greater application of preventive measures and the speed of notification and diagnosis in smaller municipalities may be linked to lower population density and lower volume of care, which facilitates a more individualized and careful approach. The proximity between health teams and the population in smaller municipalities facilitated the tracking and control of cases during the emergency phase[3], as did the simplified structure of the RAS in small municipalities, which favored more direct and rapid communication between health services and epidemiological surveillance agencies[12].

It is also necessary to consider that the greater FHS coverage in small and medium-sized municipalities facilitated the tracking and control of COVID-19 cases. The ESF played a key role in promoting continuous monitoring of families, enabling early identification of suspected cases, and facilitating rapid intervention[13]. Furthermore, the presence of Community Health Agents (CHAs) was one of the factors that contributed to the greater efficiency of these services during the critical phase of the pandemic, as they directly disseminate information, implement preventive measures, and monitor the population's health conditions. Thus, CHAs play an essential role in disease control in vulnerable communities, mainly due to their proximity to the population and their knowledge of local health conditions[14].

However, despite the speed of notification, the limited availability of specific protocols for classifying influenza-like illness and SARS in small municipalities remains a deficiency. This shortcoming can be attributed to limited technical and human resources, which hinder the implementation of more complex guidelines and the standardization of procedures, as well as the absence of continuing education programs[15]. In contrast, large municipalities, with a larger technical staff of specialists and a structure better prepared for health crises, had greater availability of these protocols. Given the significant challenges facing health systems in large urban centers, implementing protocols is essential to a more structured approach to addressing the health crisis[16].

In Portugal, one of the European countries that performed best during the COVID-19 pandemic, there was a strong organization of health services, with adaptations to the physical structure and the establishment of specific flows for suspected respiratory patients and for confirmed COVID-19 cases[17]. In China, social cohesion facilitated the initial control of the virus, with strict measures on movement outside the home, physical distancing, quarantines, and mass testing[18].

In this context, it is necessary to consider the Brazilian federal government's lack of leadership during the COVID-19 pandemic, especially given denialist actions that minimized the pandemic's severity and hindered national coordination of responses to the health crisis. The disorganization of the Ministry of Health resulted in fragmented responses, leaving many municipalities vulnerable and without adequate resources, especially small and medium-sized ones[19]. The federal government's denialist stance not only delayed the implementation of public health measures but also compromised the distribution of essential resources, such as PPE and vaccines[20].

A critical point highlighted by this study's results is the lower availability of PPE in medium-sized municipalities. The shortage of PPE in intermediate municipalities may be related to the difficulty of accessing resources during the pandemic, since these municipalities do not have the same supply priority as large urban centers, nor the same financial resources[21].

Regarding staff training and the availability of facilities for rapid COVID-19 testing, small municipalities had a higher prevalence than larger municipalities. Training professionals in the use of rapid tests was essential for early identification and isolation of cases, contributing to the control of the virus's spread[22]. Health professionals needed training not only to perform rapid tests but also to manage suspected and confirmed cases of COVID-19 efficiently, especially in regions with difficult access[23].

The training of healthcare professionals was a priority in other countries, such as China, where training professionals to conduct mass testing was one of the main strategies adopted to curb the rapid spread of the virus[24]. The combination of testing, social isolation, cordons sanitaires, and

home quarantine was associated with a reduction in the spread of SARS-CoV-2 and in the number of confirmed cases per day[4].

Another relevant aspect is the provision of guidance to the population, telephone monitoring, and follow-up of patients with COVID-19, which was also more effective in small municipalities. Therefore, it can be inferred that in large municipalities, where the volume of cases and pressure on the healthcare system were significantly higher, these practices were less frequently observed, suggesting difficulties in implementing effective large-scale monitoring[25]. It is worth noting that many people were unable to practice physical distancing because they performed essential work; on the other hand, many lost their jobs and received government assistance, which may have influenced their agreement with the relaxation of health measures[26].

It should be noted that remote monitoring strategies, such as telemedicine and telephone follow-up, emerged as an effective response during the COVID-19 pandemic, especially in areas where in-person access to health services was limited. In Brazil, the relaxation of regulations enabled virtual consultations to be incorporated into PHC, increasing the reach of medical services and providing a safe alternative for monitoring patients with mild COVID-19 symptoms[26].

Similarly, in countries such as China and India, remote monitoring was essential to ensure access to healthcare without exposing patients to infection risks in healthcare facilities. In China, telemedicine was widely used to conduct initial screenings and provide remote medical consultations, alleviating pressure on hospitals during the critical phase of the pandemic[26]. In India, telemedicine was an essential tool for managing mild and moderate COVID-19 cases, with continuous remote monitoring of symptoms[27]. These remote monitoring and telemedicine initiatives have proven vital tools in maintaining continuity of care during the critical phase of the pandemic, especially in countries with fragile health systems or significant disparities in access to medical services.

In this sense, PHC played an essential role in screening and managing suspected and confirmed cases of COVID-19, helping prevent the collapse of the healthcare system[28]. It was observed that checking bed availability before referring patients who needed hospitalization was more common in small municipalities than in others. This practice was essential during the COVID-19 pandemic, especially in low- and middle-income countries, where hospital resources were limited.

In another example, PHC workers in China were responsible for observing people in quarantine at home and in isolated centers for COVID-19, in addition to testing for COVID-19[18]. Therefore, this example can serve as inspiration for other countries in strengthening PHC and health workers.

In Brazil, bed management was a constant challenge, with hospitals in several regions facing collapse due to high demand for intensive care. PHC allowed many mild and moderate COVID-19 cases to be managed outside the hospital, freeing up beds for more severe cases. The presence of CHAs was essential for early identification of COVID-19-like symptoms and for appropriate case referral. Thus, this approach was necessary for managing limited resources and for equitable distribution of care during the critical phase of the pandemic [29].

This study has limitations inherent to its cross-sectional design, including the absence of causality and potential prevalence bias. Thus, the predominance of municipalities in the Southeast region may have generated a prevalence bias. Furthermore, the use of a self-administered questionnaire may introduce response bias. However, the sample includes representatives from all states and yields consistent, robust results on the reorganization of Brazilian PHCs during the critical phase of the pandemic.

CONCLUSION

The results indicate that municipal size directly influenced the strategies and responses adopted by PHC services during the critical phase of the pandemic, highlighting that smaller municipalities were able to maintain more direct, agile control of the situation. However, the lack of standardized protocols and the scarcity of specialized resources in these municipalities point to the need for greater attention and support from the federal government, aiming to ensure a more homogeneous, standardized, and efficient response throughout the national territory. On the

other hand, large municipalities, although better equipped in terms of infrastructure and protocols, faced the challenge of adapting these tools to high and continuous demand, which compromised aspects such as individualized patient monitoring.

Therefore, this study emphasizes the importance of public policies that account for the specificities of each municipality's size, adjust resource allocation, and develop strategies to address regional inequalities. An integrated approach, with the strengthening of the health network at all levels and the strengthening of PHC as the organizing force of the health system, is fundamental for addressing health emergencies.

ORGANIZAÇÃO E ATUAÇÃO DA ATENÇÃO PRIMÁRIA NA PANDEMIA: ESTUDO TRANSVERSAL SEGUNDO PORTE POPULACIONAL DOS MUNICÍPIOS

RESUMO

Objetivo: analisar a organização e assistência da Atenção Primária à Saúde (APS) para casos suspeitos ou confirmados de Covid-19 em municípios brasileiros, segundo o porte populacional. **Metodologia**: abordagem transversal, analítica e exploratória, com 1.474 gerentes de APS que responderam a questionário via Google Forms entre abril e setembro de 2022. As análises utilizaram razões de prevalência e regressão de Poisson com efeito aleatório. **Resultados**: em municípios pequenos (portes 1 e 2), a disponibilidade de protetor facial foi 11% mais prevalente (p<0,01) e a de estrutura e equipe para testagem 8% maior (p=0,02) do que nos de porte 3 ou 4. Nessas localidades, o atendimento em ala separada foi 35% mais frequente (p<0,01), a verificação prévia de leitos 78% mais comum (p<0,01) e a vigilância ativa 28% superior (p<0,01). A revisão dos sintomas a cada 48 horas foi 52% mais prevalente (p<0,01). Por outro lado, a adoção de protocolos clínicos para síndromes gripais foi 9% menor (p=0,01). Municípios médios (3 e 4) apresentaram menor disponibilidade de avental (p=0,03) e de desinfecção entre atendimentos (p<0,01), além de piores indicadores de acompanhamento. **Conclusão**: o porte populacional influenciou a resposta da APS, mais ágil nos municípios pequenos e mais complexa nos grandes.

Palavras-chave: : COVID-19. Atenção primária à saúde. Vigilância em saúde pública. Gestão em saúde. Demografia.

ORGANIZACIÓN Y ACTUACIÓN DE LA ATENCIÓN PRIMARIA EN LA PANDEMIA: ESTUDIO TRANSVERSAL SEGÚN EL TAMAÑO DE LA POBLACIÓN DE LOS MUNICIPIOS

RESUMEN

Objetivo: analizar la organización y atención de la Atención Primaria de Salud (APS) para casos sospechosos o confirmados de Covid-19 en municipios brasileños, según el tamaño de la población. **Metodología:** enfoque transversal, analítico y exploratorio, con 1.474 gestores de laAPS que respondieron a un cuestionario a través de Google Forms entre abril y septiembre de 2022. Los análisis utilizaron razones de prevalencia y regresión de Poisson con efecto aleatorio. **Resultados:** en municipios pequeños (tamaños 1 y 2), la disponibilidad de pantallas faciales fue un 11% más frecuente (p<0,01) y la de la estructura y el equipo para las pruebas fue un 8% mayor (p=0,02) que en tallas 3 o 4. En estos lugares, la atención en una sala separada fue un 35% más frecuente (p<0,01), la revisión previa de las camas fue un 78% más frecuente (p<0,01) y la vigilancia activa un 28% mayor (p<0,01). La revisión de síntomas cada 48 horas fue un 52% más prevalente (p<0,01). Por otro lado, la adopción de protocolos clínicos para síndromes similares a la gripe fue un 9% menor (p=0,01). Los municipios de tamaño medio (3 y 4) presentaron menor disponibilidad de delantales (p=0,03) y menor desinfección entre visitas (p<0,01), además de indicadores de seguimiento peores. **Conclusión:** el tamaño de la población influyó en la respuesta de la APS, que fue más ágil en municipios pequeños y más compleja en los grandes.

Palabras clave: COVID-19. Atención primaria de salud. Vigilancia en salud pública. Gestión en salud. Demografía.

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