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ORIGINAL ARTICLE

Primary Health Care Qualification for laboratory diagnosis of COVID-19 in the Federal District, 2020-2021

Qualificação da Atenção Primária à Saúde para o diagnóstico laboratorial da covid-19 no Distrito Federal, 2020-2021

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ABSTRACT The COVID-19 pandemic required the reorganization of PHC Units (UBS) to ensure greater laboratory diagnostic capacity timely, which demanded trained health professionals, availability of inputs/materials, and adequate sample management strategies at the Central Laboratory (LACEN). In 2020-2021, an analytical cross-sectional census study evaluated the UBS structure in the Federal District (DF). Data were collected remotely through structured telephone interviews and a self-completed questionnaire. Statistical analysis was carried out in Software R, comparing UBS-Sentinel with UBS-Traditional units. Nurse training in rapid testing or swab sample collection was almost universal (> 99%) and high among nursing technicians (70%). On the other hand, only 9% of doctors received any training. A defined flow was registered to forward samples to LACEN in 89% of UBS to diagnose SARS-CoV-2. The deadlines for returning laboratory results were met in 70% of cases. Inputs, materials, and equipment were available in sufficient amounts, especially at UBS-Sentinel units. In these UBS, 63% of the teams knew the MA-LACEN-0007 collection manual, compared to 35% at UBS-Traditional units ($p < 0.001$). Despite the challenges, the DF showed a satisfactory response capacity regarding the COVID-19 laboratory diagnosis.

KEYWORDS Surge capacity. Primary Health Care. Public health surveillance. COVID-19.

RESUMO *A pandemia de covid-19 exigiu reorganização das Unidades Básicas de Saúde (UBS) para garantir maior capacidade diagnóstica laboratorial em tempo oportuno, o que requereu profissionais de saúde capacitados, disponibilidade de insumos/materiais e estratégias adequadas de manejo das amostras no Laboratório Central (Lacen). Em 2020-2021, a estrutura das UBS do Distrito Federal (DF) foi avaliada por meio de estudo transversal analítico, censitário. A coleta de dados, remota, ocorreu por entrevista telefônica estruturada e questionário de autopreenchimento. Fez-se análise estatística no software R, comparando UBS-Sentinela com UBS-Tradicional. A capacitação no teste rápido e/ou na coleta da amostra por swab entre enfermeiros foi quase universal (> 99%), e entre técnicos de enfermagem, foi alta (70%); por outro lado somente 9% dos médicos receberam alguma capacitação. Registrou-se fluxo definido para encaminhar amostras para o Lacen em 89% das UBS, visando diagnosticar o Sars-CoV-2; os prazos de retorno dos resultados laboratoriais foram cumpridos em 70% dos casos. Insumos, materiais e equipamentos estavam disponíveis em quantidades suficientes, sobretudo nas UBS-Sentinela. Nestas, 63% das equipes conheciam o manual de coleta MA-LACEN-0007, comparado com 35% das equipes na UBS-Tradicional ($p < 0,001$). Apesar dos desafios, o DF apresentou capacidade de resposta satisfatória quanto ao diagnóstico laboratorial de covid-19.*

PALAVRAS-CHAVE *Capacidade de resposta ante emergências. Atenção Primária à Saúde. Vigilância em saúde pública. Covid-19.*

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Introduction

On December 31, 2019, several cases of pneumonia of unknown etiology in Wuhan, China, were reported by the People's Republic of China to the World Health Organization (WHO), later attributed to the SARS-CoV-2 virus. The first known South American case occurred on February 26, 2020[1,2]. In Brazil, the Federal District (DF) registered the first case on March 5, 2020[3] – and on March 11, the WHO declared the COVID-19 outbreak a Public Health Emergency of International Concern (PHEIC)[1,2]. This disease's most common signs and symptoms are respiratory infection, fever, cough, dyspnea, muscle pain, diarrhea, chest pain, and headache[4-6].

On May 5, 2023, the WHO declared the end of the PHEIC for COVID-19 due to the declining incidence of morbimortality and the high levels of immunization of the population against SARS-CoV-2. However, COVID-19 remains characterized as a pandemic because it is an infectious disease that still causes deaths worldwide[7]. In Brazil, as of October 30, 2023, there were 37,905,713 cases and 706,531 deaths (fatality rate of 1.9%)[3].

Primary Health Care (PHC) is the gateway to the Unified Health System (SUS). It plays a crucial role in the reception, prevention, diagnosis, and management of patients in the community due to its ability to reduce the overload of specialized care, especially in hospitals, organize the flow of users, and coordinate care[8].

PHC has been discussed worldwide as one of the main strategies for controlling the COVID-19 pandemic, including testing and reporting.[9] Early in the pandemic, diagnostic testing was recommended for individuals with symptoms or those exposed to people with suspected or confirmed COVID-19. Testing was also recommended for travel, leisure, and social and professional gatherings[10-11]. Timely test results helped inform patient recommendations, protect healthcare workers, and limit COVID-19 transmission[12].

Thus, PHC contributed significantly to achieving equity and universality and acting in an integrated manner in health surveillance actions in the territories during the health crisis[13-17]. Despite this, PHC health professionals faced insufficient training and input shortages and had to reorganize themselves for the new care flows[18-20]. Furthermore, substandard working conditions have been documented in Asian and European countries, which resulted in lower care quality, representing a threat to the safety of patients and health professionals[19,21,22].

In the case of the COVID-19 pandemic, following the guidelines established by the WHO and the Ministry of Health[23,24], the Sentinel PHC units (UBS-Sentinel) developed actions to investigate outbreaks in a systematic, continuous, routine, and timely manner to respond to the pandemic. A sentinel unit collaborates in realizing health surveillance actions. It is an efficient and cost-effective way of collecting and managing data for managing diseases, especially infectious diseases[24].

In the Federal District, in addition to the UBS-Sentinel actions, the PHC Qualification Program (QualisAPS), established by Ordinance Nº 39 of January 23, 2019[25], has closely monitored the restructuring of UBS to better qualify care for users and, in 2020, evaluated the APS response to the COVID-19 pandemic[26].

After the declared end of the international health emergency, COVID-19 took on another aspect: it became an infectious disease requiring continuous management, as with other notifiable diseases in Brazil that require constant monitoring[7].

Despite the importance of knowing the epidemiological scenario experienced and the adaptations made in PHC to confront and diagnose the disease, there is a shortage of Brazilian studies that show this learning, which can be preserved and improved to sustain its control and prepare for other epidemics, supporting strategic programming, monitoring, and evaluation actions targeting

infectious diseases at the first healthcare level.

When considering the need to identify PHC preparedness to respond to the demands of the pandemic in the epidemiological scenario of the international health emergency, this study analyzes the capacity of the PHC units (UBS) of the Brazilian Federal District (DF) for the laboratory diagnosis of COVID-19, including training of professionals, sample management strategies, and availability of diagnostic tests from 2020 to 2021.

Material and methods

This cross-sectional, analytical, census study was developed within the QualisAPS Program context. The data of interest were collected remotely from August 2020 onwards. Two (1.2%) of the 165 UBS in the Federal District delayed data collection but completed it on January 4 and 7, 2021. Thus, more than 99% of the data were collected in the first year of the pandemic (2020). Thus, we completed the research with 159 UBS (sample loss of 3.6%).

The managers of all UBS were contacted in advance to clarify the research and the requirement to sign the Informed Consent Form (TCLE), which must be done electronically before the interview.

The methodology involved interviews and completing a form. The interviews were structured and conducted via telephone calls with managers or supervisors from 159 UBS in the Federal District. After that, each respondent self-completed the electronic form, the link to which was made available via email.

An instrument developed as part of the activities of the QualisAPS Program was used to analyze the structure and response capacity of UBS to COVID-19 to produce information and collect data. This instrument comprises 11 Axes: Axis 1 (Respondent identification); Axis 2 (UBS identification); Axis 3 (UBS operation during the COVID-19 pandemic); Axis 4 (Workforce training); Axis 5 (Work organization and process); Axis 6 (Structure); Axis 7 (Equipment, furniture, and inputs); Axis 8 (Personal Protective Equipment – PPE); Axis 9 (Patient monitoring and exams); Axis 10 (Information, surveillance, integration and communication); and Axis 11 (Management). In total, 127 items made up the instrument. Furthermore, its application was divided into two modules: telephone (average duration of 45 minutes) and self-completion (average duration of 60 minutes)[26].

For Axis 4, we chose to analyze the variables related to the professional nurses, nursing technicians, doctors, dental surgeons, and oral health technicians who were legally qualified to perform the COVID-19 tests and diagnoses during the pandemic, sometimes because it is an action inherent to their professional practice (Medicine and Nursing) or because their professional entity authorized them to do so (Dentistry)[27].

The instrument was hosted on the Research Electronic Data Capture Software (REDCap), an open-access data collection platform created by Vanderbilt University in Tennessee, United States of America[29].

The DF has 165 UBS, 61 of which are UBS-Sentinel for monitoring flu and severe acute respiratory syndrome; the remaining 104 are UBS-Traditional. The geographic distribution of the 159 participating UBS by Health Region (HR) was verified to identify the locations with the highest concentration of UBS-Sentinel units, specifying the Traditional and Sentinel UBS, using QGIS (version 3.20 .2, Odense), free and open-source Geographic Information System.

Statistical analyses were performed using R software (version 4.3.1), including relative frequency and Chi-square and Fisher's tests. All study variables were crossed with the UBS-Sentinel variable to identify the percentage differences between these types and the UBS-Traditional, adopting a significance level of 5%. Therefore, the null hypothesis was rejected per each test applied for a p-value below 0.05.

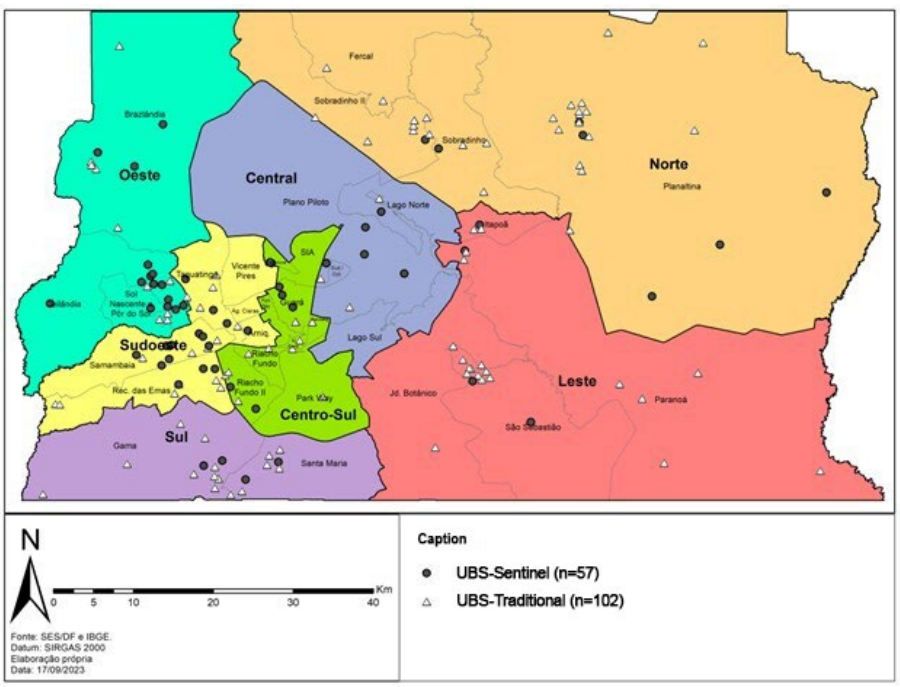
This study was approved by the Research Ethics Committee of the Faculty of Health Sciences of the University of Brasília

under the Certificate of Presentation of Ethical Appreciation (CAAE) Nº 29640120.6.0000.0030 and Opinion Nº 3.937.242, per Resolution Nº 510/2016 of the National Health Council[30].

Results

The 57 UBS-Sentinel are concentrated in more significant numbers in HR Southwest and West, both with 15. In this study, we described the qualification for the diagnosis of COVID-19 of 159 UBS that responded to the instrument to evaluate the structure. The UBS are distributed across the seven HRs of the DF, namely: Central (n=9), Center-South (n=18), East (n=24), North (n=35), West (n=27), Southwest (n=28), and South (n=18); 35.8% (n=57) are UBS-Sentinels, and 64.2% (n = 102) are UBS-Traditional (*figure 1*).

Figure 1. Spatial distribution of PHC Units, by health regions, with differentiation between Sentinel UBS and Traditional UBS Units. Federal District, 2020 and 2021



Source: Prepared by the authors.

Concerning the training of UBS professionals, training in rapid testing or swab sample collection among nurses was almost universal (99.7%) and high (70.4%) among nursing technicians, with no significant association between the proportion of trained professionals and UBS type. Doctors' lack of training to run both tests is noteworthy in UBS-Sentinel and UBS-Traditional (91.2% and 90.2%, respectively, without any training) (*table 1*). Oral health technicians were trained to run rapid tests (antibody tests) for the timely diagnosis of COVID-19, which was more frequent at UBS-Sentinel (38.6%) than at UBS-Traditional (26 .5%) units, and statistically significant ($p < 0.016$).

Table 1. Professional training of the PHC Units of the Federal District to perform and collect the different COVID-19 tests, 2020-2021

Professional Category	Test type	UBS-Traditional		UBS-Sentinel		UBS Total		Association between UBS type and study variations
		n	%	n	%	n	%	P-value
Nurse	No test	0	0	1	1.7	1	0.6	0.276
	Swab collection and rapid test	94	92.2	52	91.2	146	91.8	
	Rapid test	8	7.8	4	7.0	12	7.5	
Nurse technician	No test	27	26.5	20	35.1	47	29.6	0.520
	Swab collection and rapid test	12	11.8	6	10.5	18	11.3	
	Rapid test	63	61.8	31	54.4	94	59.1	
Doctor	No test	92	90.2	52	91.2	144	90.6	1.000
	Swab collection and rapid test	9	8.8	5	8.8	14	8.8	
	Rapid test	1	1.0	0	0	1	0.6	
Dental surgeon	No test	67	65.7	34	59.6	101	63.5	0.501
	Swab collection and rapid test	5	4.9	5	8.8	10	6.3	
	Rapid test	30	29.4	18	31.6	48	30.2	
Oral health technician	No test	75	73.5	35	61.4	110	69.2	0.016
	Swab collection and rapid test	1	1.0	6	10.5	7	4.4	
	Rapid test	26	25.5	16	28.1	42	26.4	

Source: Prepared by the authors.

Regarding how training was conducted to perform COVID-19 tests in the professional categories studied, 93.1% of professionals from UBS-Traditional, compared to 86% of professionals from UBS-Sentinel, indicated that they underwent this training by reading technical notes and analyzing COVID-19 management protocols (92.2% UBS-Traditional and 80.7% UBS-Sentinel) (*table 2*).

Table 2. Training methods for professionals at Basic Health Units in the Federal District to perform different COVID-19 tests, 2020-2021

Training methods[a]	Answer	UBS-Traditional		UBS-Sentinel		UBS Total	
		n	%	n	%	n	%
Completed online course	Yes	41	40.2	27	47.4	68	42.8
	No	61	59.8	30	52.6	91	57.2
Participated in workshops	Yes	19	18.6	9	15.8	28	17.6
	No	83	81.4	48	84.2	131	82.4
Completed classroom course	Yes	13	12.7	9	15.8	22	13.8
	No	89	87.3	48	84.2	137	86.2
Completed COVID-19 testing training	Yes	51	50.0	21	36.8	72	45.3
	No	51	50.0	36	63.2	87	54.7

Table 2. Training methods for professionals at Basic Health Units in the Federal District to perform different COVID-19 tests, 2020-2021

		UBS-Traditional		UBS-Sentinel		UBS Total	
Training methods [a]	**Answer**	**n**	**%**	**n**	**%**	**n**	**%**
Reading technical notes on COVID-19 testing	Yes	95	93.1	49	86.0	144	90.6
	No	7	6.9	8	14.0	15	9.4
Analyzing COVID-19 management protocols	Yes	94	92.2	46	80.7	140	88.1
	No	8	7.8	11	19.3	19	11.9
Analyzing guidelines of scientific societies	Yes	34	33.3	15	26.3	49	30.8
	No	68	66.6	42	73.7	110	69.2

Source: Prepared by the authors.

[a] More than one answer option allowed.

When checking the availability of materials and inputs for processing or sending tests for the diagnosis of COVID-19, we observed no significant difference between the UBS-Sentinel and the UBS-Traditional for most of the items researched (except labels). In the case of having a refrigerator, 80.7% of UBS-Sentinel units stated that they had this equipment for storing samples for COVID-19 compared to 60.8% of UBS-Traditional units, which highlights an association between having a label and refrigerator ($p < 0.019$ and $p < 0.009$ respectively) and being a UBS-Sentinel unit.

More than 50% of the UBS, regardless of whether they were Sentinel or Traditional, had a thermometer, isothermal box, and rigid reusable artificial ice to preserve samples for COVID-19 at the ideal temperature (*table 3*).

Table 3. Availability of diagnostic materials and supplies for processing COVID-19 test samples in Primary Health Care. Federal District, 2020-2021

								Association between UBS type and study variations
		UBS-Traditional		UBS-Sentinel		UBS Total		
Variable	**Answer**	**n**	**%**	**n**	**%**	**n**	**%**	**P-value**
UBS has the materials below to identify and store samples								
Permanent marker	Yes	15	14.7	13	22.8	28	17.6	0.198
	No	87	85.3	44	77.2	131	82.4	
Label	Yes	43	42.2	35	61.4	78	49.1	0.019
	No	59	57.8	22	38.6	81	50.9	
Isothermal box	Yes	83	81.4	51	89.5	134	84.3	0.178
	No	19	18.6	6	10.5	25	15.7	
Hard recycled artificial ice	Yes	82	80.4	51	89.5	133	83.6	0.137
	No	20	19.6	6	10.5	26	16.4	
Thermometer	Yes	70	68.6	43	75.4	113	71.1	0.363
	No	32	31.4	14	24.6	46	28.9	

Table 3. Availability of diagnostic materials and supplies for processing COVID-19 test samples in Primary Health Care. Federal District, 2020-2021

		UBS-Traditional		UBS-Sentinel		UBS Total		Association between UBS type and study variations
Variable	**Answer**	**n**	**%**	**n**	**%**	**n**	**%**	**P-value**
Refrigerator	Yes	62	60.8	46	80.7	108	67.9	0.009
	No	40	39.2	11	19.3	51	32.0	
None	Yes	12	11.8	4	7.0	16	10.1	0.340
		90	88.2	53	93	143	89.9	
Availability of collection material and diagnostic COVID-19 tests								
Swab Kit: sample collection for RT-PCR	Insufficient	24	25.5	15	26.3	39	24.5	0.695
	Sufficient	78	76.5	42	73.7	120	75.5	
Rapid test	Insufficient	34	33.3	22	38.6	56	35.2	0.505
	Sufficient	68	66.7	35	61.4	103	64.8	

Source: Prepared by the authors.

When managers were asked about the availability of COVID-19 diagnostic tests in their UBS at the time of the research, more than half of the UBS (Sentinel or Traditional) had sufficient swab test kits and rapid tests (*table 3*).

For the managing test samples, that is, the flow between PHC and the Central Public Health Laboratory of the Federal District (LACEN-DF), the results showed an association between being UBS-Sentinel and the team knowing the MA-LACEN-0007 collection manual, emphasizing that more than half of the Sentinel UBS teams (63.2%) reported knowing it when compared to the Traditional UBS teams (35.3%) ($p < 0.000$).

The materials collected at the UBS were mainly sent to LACEN-DF at the Sentinel and Traditional UBS (92.9% and 85.3%, respectively). The significant majority of UBS-Sentinel (94.7%) and UBS-Traditional (85.3%) stated that they had a defined laboratory flow for forwarding samples and the availability of a vehicle to transport samples with a defined route (around 80% to 90%). The proportions were higher in the UBS-Sentinel, although the differences were insignificant (*table 4*).

Table 4. Collection and management of COVID-19 test samples from PHC Units. Federal District, 2020-2021

		UBS-Traditional		UBS- Sentinel		UBS Total		Association between UBS type and study variations
Sample management[a]	**Answer**	**n**	**%**	**n**	**%**	**n**	**%**	**P-value**
Is the team familiar with the MA-LACEN-0007 collection manual?	Yes	36	35.3	36	63.2	72	45.3	0.000
	No	66	64.7	21	36.8	87	54.7	
Is there a collection of material for COVID-19 testing sent to Lacen?	Yes	87	85.3	53	92.9	140	88.1	0.151
		15	14.7	4	7.0	19	11.9	

Table 4. Collection and management of COVID-19 test samples from PHC Units. Federal District, 2020-2021

		UBS-Traditional		UBS- Sentinel		UBS Total		Association between UBS type and study variations
Sample management [a]	**Answer**	**n**	**%**	**n**	**%**	**n**	**%**	**P-value**
Is there a defined flow for forwarding samples to Lacen-DF?	Yes	87	85.3	54	94.7	141	88.7	0.166
	No	15	14.7	3	5.3	18	11.3	
Is there a vehicle available within 48 hours of collection?	Yes	86	84.3	54	94.7	140	88.0	0.089
	No	16	15.7	4	5.3	19	11.9	
Does the vehicle follow a pre-established route between the UBS in the Health Region?	Yes	82	80.4	53	92.9	135	84.9	0.097
	No	20	19.6	4	7.0	24	15.1	
Are the deadlines for returning laboratory results for COVID-19 met?	Yes	69	67.6	42	73.7	111	69.8	0.426
		33	32.3	15	26.3	48	30.2	
Have healthcare professionals had timely access (whenever necessary) to the protocols and technical regulations established to mitigate COVID-19?	Yes	99	97.1	55	96.5	154	96.8	1.000
	No	3	2.9	2	3.5	5	3.2	

Source: Prepared by the authors.

[a] More than one answer option allowed.

Although there was no evidence of an association between the Sentinel and Traditional UBS in meeting laboratory return deadlines, more than half of both UBS (73.7% and 67.6%, respectively) reported receiving the results of COVID-19 laboratory tests within the deadlines.

Discussion

In 2020, the Brazilian Institute of Geography and Statistics (IBGE) did not perform the census, but population estimates for the DF that year indicated 3,052,546 inhabitants[31]. The results revealed that the distribution of UBS-Sentinel units in the HR was proportional to the number of inhabitants, with a more significant number of UBS-Sentinel units concentrated in the two most populous HRs: Southwest, with 829,672 inhabitants, and West, with 507,851 inhabitants. Furthermore, they were the regions with the highest number of cases and deaths[3]. Conversely, HR South, which has 272,959 inhabitants, appeared with the lowest number of UBS-Sentinel units.

Due to its premise established in the National Primary Care Policy (PNAB), the Traditional UBS units are characterized by care based on the SUS principles and guidelines regarding health promotion and disease prevention activities. During the pandemic, they were restructured for immediate care to contain the disease, with service offerings targeting almost exclusively COVID-19 due to its high incidence[32]. However, in 2023, given the end of the international health emergency, actions targeting COVID-19 are still offered in the Traditional UBS. However, they focus on managing it as a notifiable disease, whose vaccine is now included in the National Immunization Program (PNI) calendar and no longer in the Operational Plan for Vaccination Against the New Coronavirus.

Furthermore, several programs, services, and workshops were resumed due to the disease's reduced incidence and behavior

for specific groups and general users[33]. The UBS-Sentinel units remain active as they are intended to operate as an active observatory of the quality and safety of products and services regardless of pandemics. Among their objectives are assistance to the continuous improvement of risk management in health services and the contribution to the training activities of health professionals, such as continuing education and production of knowledge in their scope of action[34].

During the COVID-19 pandemic, the UBS-Sentinel units supported trend analysis and management of disease transmission risk by recording and monitoring cases. The WHO provided Member States, including Brazil, with guidance on preparation, readiness, and response, highlighting the relevance of strengthening existing national systems to increase surveillance capacity[35].

In 2020, the DF government issued Technical Note Nº 5, defining the response levels of the PHC service to combat COVID-19. These include monitoring care by HR to provide opportunities for case resolution and mitigating the disease, increasing response capacity, ensuring access, diagnosis, adequate treatment, and referral of complex cases to other care levels besides telemonitoring confirmed or suspected cases. Diagnostic capacity refers to the health system's response to mobilizing quickly in the face of increased demand arising from large-scale needs or public health emergencies[36].

Implementing work reorganization and applying diagnostic tests required timely training of front-line health professionals to minimize risks to themselves and users[19-20]. PHC health professionals were trained in strategies for understanding flu syndrome, infection risk control measures, biosafety improvement, investigating suspected cases of SARS-CoV-2 infection, health education in the community on safety measures protection against the virus, and procedures to ensure their health during the collection and handling of samples that cause health problems[37].

In-service training through reproducing real-world situations in a safe environment is an appropriate methodology for preparing professionals to address diseases[38]. However, considering the COVID-19 pandemic, which surged with an accelerated spread of cases and deaths and a shortage of inputs and materials, health services were required to adapt rapidly. This meant that most of the training occurred online and was self-instructional, with the dissemination of technical notes and protocols prepared by the WHO and the DF State Health Secretariat. This development of standards, routines, protocols, and service flows guided the reorganization of care provision in this scenario[39] and was probably favored by the Family Health teams (eSF).

Although evidence points to the Family Health Strategy (ESF) as a tool that favors an organized response to health problems in PHC, the coordination of care, and referral to specialized services[40], the DF PHC was only organized as such in 2017, when the '*Converte APS*'[41] was implemented.

Among other actions, when *Converte APS* was implemented, besides training professionals in family and community medicine toward the new generalist way of offering care to the population, opening hours expanded in the UBS with four or more eSFs (due to the possibility of composing schedules), moving to 7 am to 7 pm, uninterruptedly and 7 am to 12 pm on Saturdays, with the possibility of opening until 10 pm. Considering that the pandemic began in 2020, we can infer that the change in flows and routines imposed by SARS-CoV-2 found PHC better focused on the concepts of client enrollment and longitudinal monitoring, fundamental to sentinel surveillance and COVID-19 management[41].

Another critical point is that almost all nurses stated they were qualified to perform rapid tests (and swab collection), contributing to the early diagnosis of suspected COVID-19 cases, contact screening, and conducting educational actions. In this context, nursing was center-stage in the organization of services,

searching for the provision of necessary inputs and materials and conducting training with other team professionals to run tests, manage inputs and samples, and be updated on vaccines[39]. The pandemic's dynamics modified the work process and care offerings of medical professionals and other PHC workers. Although they recognize their relevance in managing infected patients, preventing disease, ensuring continuity of treatment for non-infected patients, and being trained to act in emergencies, a study in São Paulo showed that this was insufficient to prepare them to face COVID-19[42].

Tackling this disease required inputs, the development of diagnostic tests to detect SARS-CoV-2 by industries[43], the contribution of teaching and research institutions[44], and laboratory operationalization[45]. The findings of this study highlight the relevance of inputs and the management and definition of sample flows to laboratories by PHC in the DF, aligned with studies by other authors[46], who reported the essential role of PHC due to its capillarization in the Brazilian territory and for its ability to reorganize in the face of the health crisis, increasing epidemiological surveillance actions, with adequate reception, tracking, diagnosis, and notification of COVID-19 cases.

This study identified that rapid tests and swab tests existed in sufficient amounts in more than 60% of UBS in the DF, corroborating the recommendations of the Guide on Integrated Surveillance of Acute Respiratory Syndromes Coronavirus Disease 2019, Influenza, and other respiratory viruses[47] and Technical Note Nº 3048, which describes PHC actions as a starting point for investigating COVID-19 cases, diagnosis through the tests mentioned above, and monitoring of service users tested with a positive result for SARS-CoV-2.

The diagnostic methods used to detect COVID-19 in PHC were rapid tests found in two types on the market: I) Those that identify proteins in the infection's active phase, known as antigen tests, and II) Those that detect antibodies as the body's immune response when exposed to the virus, both called serological methods. There were also molecular methods with the Reverse Transcriptase Polymerase Chain Reaction (RT-PCR) technique, considered the gold standard by the WHO[35] due to its high sensitivity and specificity and for identifying the virus RNA by amplifying nucleic acid by polymerase chain reaction in the sample collected by the oral/nasal swab test[49].

Thus, in addition to the availability of tests, we underscore the relevance of available materials and inputs, such as a refrigerator, isothermal box, and rigid recycled artificial ice, for handling samples in PHC. These align with WHO recommendations[23] for storing samples collected by the oropharyngeal and nasopharyngeal swab test at temperatures around 2-8 ºC. Furthermore, the literature review by Loeffelholz et al.[43] reported the importance of sample handling to increase the likelihood of diagnosis of the analyzed biological marker.

This study has limitations inherent to cross-sectional studies regarding the temporality of observation and the data collection method, by telephone and self-completed questionnaire, having obtained the data mentioned above, given the impossibility of doing it in person due to the pandemic outlook.

Conclusions

We noticed that the UBS COVID-19 diagnostic capacity was linked to challenges related to testing and diagnosis. Doctors were the UBS-Sentinel professionals who reported less training to run the tests than nurses and oral health technicians. This training for all professionals studied occurred mainly in a self-instructional way, with online courses as reading protocols. Protocols for handling samples and flows for their processing were in place. Also, communication with LACEN-DF was satisfactory, as most of the samples were sent promptly.

The materials and supplies for collecting, storing, and processing the samples were available in sufficient amounts most of the time at the UBS-Sentinel, such as adhesive labels for identifying the samples and the refrigerator. Considering that PHC is the organizer of care in Healthcare Networks, having trained professionals to run tests, manage samples, coordinate the laboratory, and having inputs, materials, and equipment available meant that the DF had adequate diagnostic capacity for COVID-19. Although this study shows a satisfactory response in facing the COVID-19 pandemic, it is necessary to analyze the potentialities and challenges faced by PHC in the DF so that new interventions can be implemented in the context of strategic planning at different levels of local management to prepare in advance for other health crises.

Collaborators

Cavalcante FV (0000-0002-8706-0457)* and Santos LMP (0000-0002-6739-6260)* contributed to the design and planning, data interpretation and analysis, writing, critical review of content and approval of the final version of the manuscript. Sacco RCCS (0000-0001-6131-0852)*, Oliveira A (0000-0002-3084-6491)*, Passos TS (0000-0002-5312-095X)*, Alencar TM (0009-0007-8724-2158)*, and Martin CPS (0000-0003-1829-1515)* contributed to data interpretation and analysis, writing, critical review of content and approval of the final version of the manuscript. ■

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