

Organization and assistance of primary health care facing COVID-19

Organização e assistência da atenção primária à saúde no enfrentamento da COVID-19

Organización y asistencia de la atención primaria de salud en el enfrentamiento al COVID-19

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ABSTRACT

Objective: to analyze the organization and assistance of Primary Health Care services facing COVID-19. **Method:** cross-sectional study carried out with 49 health professionals from basic health units and family health strategy in the city of São Carlos. Data were collected through a self-answered questionnaire from May 2021 to February 2022. Associations were analyzed using the chi-square test and prevalence ratios were estimated. The research protocol was approved by the Research Ethics Committee. **Results:** identification of the patient's signs and symptoms, guidance on prevention measures and checking the availability of beds in reference hospitals were variables that differed between health services. **Conclusion:** Primary Health Care services play a central role facing COVID-19 pandemic, with managers needing to identify weaknesses and direct ongoing education actions in the face of new scenarios.

Descriptors: Health Policy; Health Management, Primary Health Care; COVID-19.

RESUMO

Objetivo: analisar a organização e assistência dos serviços da Atenção Primária à Saúde no enfrentamento da COVID-19. **Método:** estudo transversal realizado com 49 profissionais da saúde de unidades básicas de saúde e estratégia de saúde da família no município de São Carlos. Os dados foram coletados por meio de questionário auto respondido no período de maio de 2021 a fevereiro de 2022. As associações foram analisadas por teste qui-quadrado e estimadas as razões de prevalência. O protocolo de pesquisa foi aprovado pelo Comitê de Ética em Pesquisa. **Resultados:** a identificação de sinais e sintomas do paciente, orientações sobre as medidas de prevenção e verificação da disponibilidade de leitos em hospitais de referência, foram variáveis que se apresentaram diferentes entre os serviços de saúde. **Conclusão:** a APS exerce papel central no enfrentamento da pandemia, com necessidade de os gestores identificarem as fragilidades e direcionarem ações de educação permanente diante de novos cenários. **Descritores:** Política de Saúde; Gestão em Saúde; Atenção Primária à Saúde; COVID-19.

RESUMEN

Objetivo: analizar la organización y asistencia de los servicios de Atención Primaria de Salud en el combate al COVID-19. **Método:** estudio transversal realizado con 49 profesionales de la salud de unidades básicas de salud y estrategia de salud de la familia de la ciudad de São Carlos. Los datos se recolectaron a través de un cuestionario de auto respuesta desde mayo de 2021 hasta febrero de 2022. Se analizaron las asociaciones mediante la prueba de chi-cuadrado y se estimaron las razones de prevalencia. El protocolo de investigación lo aprobó el Comité de Ética en Investigación. **Resultados:** la identificación de los signos y síntomas del paciente, las orientaciones sobre medidas de prevención y la verificación de la disponibilidad de camas en los hospitales de referencia fueron variables que difirieron entre los servicios de salud. **Conclusión:** La APS juega un papel central en el enfrentamiento a la pandemia, siendo necesario que los gestores identifiquen debilidades y orienten acciones educativas continuas ante nuevos escenarios. **Descriptores:** Política de Salud; Gestión en Salud; Atención Primaria de Salud; COVID-19.

INTRODUCTION

The impact of the Coronavirus disease type 2 (COVID-19) pandemic has required rapid reorganization of healthcare systems around the world in order to minimize the burden on healthcare services and avoid collapse. Tackling COVID-19 was widely discussed by managers from different spheres of government, and the reorganization was initially aimed at hospital services¹.

However, with the evolution of the pandemic, it was found that the majority of cases were mild, resulting in the need for new strategies to prevent contagion and manage people with mild symptoms who did not require hospitalization^{2,3}.

In this context, Primary Healthcare (PHC) stands out as the ideal scenario to accommodate this demand, as it is capable of supporting and maintaining an active link with the community, providing continuous and effective care. With the new demand, it was necessary for PHC services to adapt, and in the absence of vaccines and specific medicines

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for COVID-19, actions at this level of healthcare were initially directed towards developing measures aimed at reducing virus transmission, such as to disseminate guidelines regarding the need to adopt non-pharmacological prevention measures, in addition to testing and surveillance of cases².

This restructuring of PHC was experienced differently between countries, states and municipalities. Measures were adopted in Brazil, such as separating the flow of those suspected or diagnosed with COVID-19 from those with other complaints; use of remote service through teleservice and telemonitoring; implementing health units with exclusive care for respiratory symptoms; readjusting the role of some team members, such as professionals from the Family Health Support Center (*Núcleo de Apoio à Saúde da Família - NASF*) and Community Health Agents (*Agentes Comunitários de Saúde - ACS*)⁴⁻⁷.

In addition to the actions to reorganize the flows of health units, PHC services worked together with epidemiological surveillance in tracking confirmed cases and their close contacts, favored by proximity and bond with the users of the health system provided by the Family Health Strategy (*Estratégia Saúde da Família - ESF*), in addition to providing care to the most economically vulnerable populations and those at greater risk of worsening, such as older adults and those with chronic diseases^{8,9}.

Similar measures were adopted in other countries within the scope of PHC, as professionals screened suspected cases via teleconsultation in order to reduce exposure risk, in addition to reorganizing the care flow between suspected and/or confirmed cases and other types of care, aiming to alleviate hospital demand^{10,11}. Technology was fundamental in ensuring maintained care for the population, in addition to reorganizing the flow of patients, aiming to serve users, including people diagnosed with COVID-19, safely through immediate and remote care¹⁰.

PHC played an important role in disseminating and operationalizing vaccination regarding the start of vaccination campaigns against COVID-19, especially in Brazil, being established by the Ministry of Health. Furthermore, throughout the evolution of vaccination there was a reduction in the number of cases, and services which were discontinued during the pandemic began to gradually resume and readapted to the new scenario¹²⁻¹⁴.

Several studies analyzed PHC during the pandemic, especially on aspects related to adaptation in care, care flow and use of new health technologies^{3,8,10}. However, due to the central role of PHC in tackling COVID-19, gaps remain in the literature on reorganization and care provided to users during one of the most critical moments of the pandemic in order to identify the similarities and differences in PHC services, meaning in comparing the care model followed by Basic Health Units (*Unidades Básicas de Saúde - UBS*) and that which governs the *ESF* in actions related to the critical phase of the pandemic.

Therefore, this study aimed to analyze and compare the organization and care provided by Primary Healthcare services in combating COVID-19.

METHOD

This is a cross-sectional study performed in the Basic Health Units (*UBS*) and Family Health Strategies (*ESF*) in the city of São Carlos, SP, Brazil. No sample size calculation was performed for this study, as all eligible participants were invited to participate. Thus, the population eligible for the study totaled 110 health professionals belonging to the municipality's *UBS* and *ESF* units.

Professionals who worked at the institution during the COVID-19 pandemic for at least three months were included in the study. Professionals who were on leave and/or absent during the pandemic, or participants who were on leave and/or vacation at the collection time were excluded.

Data were collected through a questionnaire self-answered by participants created by the researchers themselves based on the Coronavirus (COVID-19) Clinical Management Protocol in Primary Healthcare considering the following variables: identification of a suspected case of Flu Syndrome and COVID-19; measures to avoid contagion at *UBS*; stratification of the severity of Flu Syndrome; therapeutic management and home isolation of mild cases; early diagnosis and referral to urgent/emergency or hospital services for serious cases; immediate notification; clinical monitoring; community prevention measures and support for active surveillance. The instrument was then evaluated by three experts in the field to verify the relevance and suitability of the instrument; however, a psychometric assessment was not performed.

Data collection took place from May 2021 to February 2022. Initially, it was carried out remotely, that is, the questionnaire was widely disseminated via email and telephone contact with professionals, but due to the low adherence and with the advancement of vaccination against COVID-19, the collection was completed in person.

The collected data were entered into a database built in the Microsoft Excel program. The variables were coded by the researchers according to the alternatives for each item to enable statistical analysis. A descriptive analysis was carried out and associations were subsequently analyzed using the chi-squared test. In addition, prevalence ratios were estimated with corresponding confidence intervals (only for binary questions). All analyzes were performed using the SAS 9.4 software program. A significance level of 5% was adopted for all analyses.

After approval of the research by the Research Ethics Committee (CEP), data collection began after the participants signed the Informed Consent Form (ICF).

RESULTS

A total of 49 health professionals participated in the study, 20 (40.8%) nurses, 19 (38.8%) nursing technicians or assistants, 5 (10.2%) dentists and 5 (10.2%) doctors. Of these professionals, 30 (61.2%) worked in the *UBS* and 19 (38.8%) in *USF* units. Moreover, 61 health professionals did not participate in the study due to leave, vacation and refusal. Table 1 presents data related to the prevention measures adopted for patients suspected of COVID-19 upon arrival at the health unit.

Table 1: Contagion prevention measures upon arrival and screening of patients at health units. São Carlos, SP, Brazil, 2022.

Variables	Group		P-value	UBS/USF prevalence ratio (95%CI)
	UBS (n=30)	USF (n=19)		
Prevention measures upon patient arrival at the health unit				
<i>1. Identification of symptoms</i>				
No	0 (0%)	4 (21.1%)	<0.01	-
Yes	30 (100%)	15 (78.9%)		1.27 (1.004; 1.6)
<i>2. Guidance and availability for the use of a surgical mask</i>				
No	7 (23.3%)	9 (47.4%)	0.08	-
Yes	23 (76.7%)	10 (52.6%)		1.46 (0.91; 2.33)
<i>3. Distancing the patients from each other</i>				
No	3 (10%)	1 (5.26%)	0.56	-
Yes	27 (90%)	18 (94.74%)		0.95 (0.81; 1.11)
<i>4. Separate rooms for patients who have indicated the presence of symptoms similar to those of COVID-19</i>				
No	14 (46.67%)	14 (73.68%)	0.06	-
Yes	16 (53.33%)	5 (26.32%)		2.03 (0.89; 4.62)
<i>5. Ventilated Emergency Care Unit environment</i>				
No	8 (26.7%)	4 (21.0%)	0.66	-
Yes	22 (73.3%)	15 (79.0%)		0.93 (0.68; 1.28)
<i>6. Cleaning and disinfecting equipment used from one patient to another</i>				
No	4 (13.3%)	1 (5.3%)	0.36	-
Yes	26 (86.7%)	18 (94.7%)		0.91 (0.77; 1.09)
Preventive measures in patient screening				
<i>1. Well ventilated environment</i>				
No	6 (20%)	6 (31.6%)	0.36	-
Yes	24 (80%)	13 (68.4%)		1.17 (0.82; 1.67)
<i>2. Caring for one patient at a time</i>				
No	3 (10%)	0 (0%)	0.15	-
Yes	27 (90%)	19 (100%)		0.9 (0.8; 1.01)
<i>3. Instruments and equipment used in screening are disinfected and cleaned from one patient to the next</i>				
No	7 (23.3%)	1 (5.3%)	0.10	-
Yes	23 (76.7%)	18 (94.7%)		0.81 (0.65; 1.01)
<i>4. Respiratory hygiene/cough etiquette supplies provided</i>				
Não	24 (80%)	14 (73.7%)	0.61	-
Yes	6 (20%)	5 (26.3%)		0.76 (0.27; 2.15)
<i>5. Respiratory hygiene/cough etiquette guidance provided</i>				
No	14 (46.7%)	9 (47.4%)	0.96	-
Yes	16 (53.3%)	10 (52.6%)		1.01 (0.59; 1.74)
<i>6. The trash bins are pedal operated</i>				
No	6 (20%)	4 (21.1%)	0.93	-
Yes	24 (80%)	15 (78.9%)		1.01 (0.76; 1.36)

Only the identification of signs and symptoms showed a significant difference between *UBS* and *USF* units ($p < 0.01$). Thus, it is estimated that the identification of symptoms was 27% more prevalent in the *UBS* when compared to the *USF*. Furthermore, none of the prevention measures mentioned were unanimous among the professionals' reports, pointing to an inadequacy regarding the measures to prevent COVID-19 contagion carried out in health units.

Table 2 presents the results related to guidance on preventive measures for users and precautions adopted during care in health units and notification of suspected and confirmed cases of COVID-19.

Table 2: Guidance on preventive measures for users and precautions adopted when providing care in healthcare facilities and reporting suspected and confirmed cases of COVID-19. São Carlos, SP, Brazil, 2022.

Variables	Group		P-value	USB/USF prevalence ratio (95%CI)
	UBS (n=30)	USF (n=19)		
<i>Patients who present symptoms similar to COVID-19 after screening are directed to a separate treatment room from other patients?</i>				
No	8 (26.7%)	7 (36.8%)	0.45	-
Yes	22 (73.3%)	12 (63.2%)		1.16 (0.77; 1.74)
<i>When the patient presents similar symptoms or is diagnosed with COVID-19 during the care provided at the Health Unit, they receive instructions regarding:</i>				
<i>1. Need to use a surgical mask</i>				
No	2 (6.7%)	2 (10.5%)	0.63	-
Yes	28 (93.3%)	17 (89.5%)		1.04 (0.87; 1.25)
<i>2. Respiratory hygiene</i>				
No	14 (46.7%)	4 (21.1%)	0.07	-
Yes	16 (53.3%)	15 (78.9%)		0.68 (0.45; 1.02)
<i>3. Hand hygiene</i>				
No	1 (3.3%)	2 (10.5%)	0.31	-
Yes	29 (96.7%)	17 (89.5%)		1.08 (0.91; 1.28)
<i>5. Avoid touching their eyes, mouth and nose with unwashed hands</i>				
No	10 (33.3%)	1 (5.3%)	0.02	-
Yes	20 (66.7%)	18 (94.7%)		0.7 (0.53; 0.93)
<i>6. Avoid sharing objects with other people</i>				
No	4 (13.3%)	1 (5.3%)	0.36	-
Yes	26 (86.7%)	18 (94.7%)		0.91 (0.77; 1.09)
<i>7. About isolation</i>				
No	4 (13.3%)	1 (5.3%)	0.36	-
Yes	26 (86.7%)	18 (94.7%)		0.91 (0.77; 1.09)
<i>The Health Unit monitors the patient's condition in home isolation?</i>				
Yes	30 (100%)	19 (100%)	-	-
<i>In addition to the instructions, does the patient have access to the necessary supplies?</i>				
No	1 (3.3%)	0 (0%)	0.42	-
Yes	29 (96.7%)	19 (100%)		0.97 (0.9; 1.03)
<i>When caring for patients suspected or diagnosed with COVID-19, what precautions are taken</i>				
Aerosol precautions	3 (10.3%)	3 (15.8%)	0.58	-
Contact precautions	1 (3.5%)	0 (0%)		
Droplet precautions	1 (3.5%)	2 (10.5%)		
Standard precautions	24 (82.7%)	14 (73.7%)		
<i>Does the Health Unit conduct risk classification in relation to COVID-19?</i>				
No	11 (36.7%)	6 (31.6%)	0.72	-
Yes	19 (63.3%)	13 (68.4%)		0.93 (0.61; 1.39)
<i>Regarding notification of confirmed and suspected cases of COVID-19: Does the Unit notify all confirmed and suspected cases of COVID-19?</i>				
No	3 (10%)	3 (15.8%)	0.55	-
Yes	27 (90%)	16 (84.2%)		1.07 (0.85; 1.34)

Only the instructions on touching eyes, mouth and nose with unsanitized hands showed a statistical difference ($p = 0.02$), with a 30% lower prevalence in the *UBS* when compared to the *USF*.

Next, findings on the use of PPE, hand hygiene and team training are shown in Table 3.

Table 3: Use of PPE by professionals and training on care and use of PPE, hand hygiene and availability of supplies, structure and team trained to carry out testing for COVID-19, knowledge about the management of COVID-19, risk groups and the reference of suspected and diagnosed cases of COVID-19. São Carlos, SP, Brazil, 2022.

Variable	Group		P-value	USB/USF prevalence ratio (95%CI)
	UBS (n=30)	USF (n=19)		
Regarding the use of PPE (Personal Protective Equipment): As a professional at the Unit, do you use PPE when in contact with all patients?				
Yes	25 (83.3%)	19 (100%)		0.83 (0.71; 0.98)
Only those with confirmed or suspected cases of COVID-19	5 (16.7%)	0 (0%)	0.03	-
Regarding professionals' knowledge about COVID-19: Did the Health Unit's work team have access to training on care behaviors and use of PPE in relation to COVID -19?				
No	12 (40%)	7 (36.8%)	0.83	-
Yes	18 (60%)	12 (63.2%)		0.95 (0.61; 1.49)
The transmission of Coronavirus occurs:				
Only by air	1 (3.3%)	0 (0%)	0.66	-
Only through contact with secretions from infected people	2 (6.7%)	2 (10.5%)		
Through the air and through contact with contaminated secretions	27 (90%)	17 (89.5%)		
Which of the options below are part of the risk group:				
1. Older adults				
Yes	30 (100%)	19 (100%)	-	-
2. Children under 5 years of age				
No	17 (56.7%)	14 (73.7%)	0.23	-
Yes	13 (43.3%)	5 (26.3%)		1.65 (0.7; 3.88)
3. Diabetics				
Yes	30 (100%)	19 (100%)	-	-
4. Hypertensive patients				
No	1 (3.3%)	1 (5.3%)	0.74	-
Yes	29 (96.7%)	18 (94.7%)		1.02 (0.9; 1.16)
5. Pregnant women				
No	4 (13.3%)	1 (5.3%)	0.36	-
Yes	26 (86.7%)	18 (94.7%)		0.91 (0.77; 1.09)
6. Individuals with chronic lung or heart disease				
Yes	30 (100%)	19 (100%)	-	-
7. Immunosuppressive conditions				
No	1 (3.3%)	1 (5.3%)	0.74	-
Yes	29 (96.7%)	18 (94.7%)		1.02 (0.9; 1.16)
8. Obese individuals				
No	3 (10%)	0 (0%)	0.15	-
Yes	27 (90%)	19 (100%)		0.9 (0.8; 1.01)
Regarding hand hygiene during the professional's working hours at the Unit: How do you, a healthcare professional, carry out hand hygiene during working hours??				
With soap and water	1 (3.3%)	0 (0%)	0.42	-
With alcohol gel and soap and water	29 (96.7%)	19 (100%)		0.97 (0.9; 1.03)
How often do you, a healthcare professional, perform hand hygiene?				
Every time I come into contact with a patient or perform a procedure	30 (100%)	19 (100%)	-	-
Does the Unit you work in have a functioning alcohol gel dispenser?				
No	1 (3.3%)	6 (31.6%)	<0.01	-
Yes	29 (96.6%)	13 (68.4%)		1.41 (1.03; 1.93)
Does the Unit you work in have liquid soap for hand hygiene for patients and professionals?				
No	2 (6.7%)	3 (15.8%)	0.30	-
Yes	28 (93.3%)	16 (84.2%)		1.11 (0.89; 1.38)
Does the Unit have a structure and team capable of carrying out tests for COVID-19?				
No	18 (60%)	12 (63.2%)	0.83	-
Yes	12 (40%)	7 (36.8%)		1.09 (0.52; 2.26)
Does the Health Unit you work at check whether the reference hospital for hospitalization cases due to COVID-19 has enough beds available to receive the patient who requires hospitalization before referring him or her?				
No	18 (60%)	19 (100%)	<0.01	0.6 (0.45; 0.8)
Yes	12 (40%)	0 (0%)		-

It was found that the use of PPE by health professionals when in contact with patients had a 17% lower prevalence in the *UBS* when compared to the *USF* units. In addition, no variable presented a statistically significant result in the assessment of the knowledge of health unit professionals on managing COVID-19 and risk groups. The prevalence of the presence of alcohol gel dispensers was 41% higher in the *UBS* when compared to the *USF* units. A 41% higher prevalence was also evidenced in *UBS* when compared to *USF* in relation to checking available beds in reference hospitals for COVID-19 before referring the user who needed hospitalization.

DISCUSSION

The perception of health professionals regarding the organization and care provided by PHC in dealing with COVID-19 is essential for adequate and safe care to be provided for both professionals and patients. Identification of the patient's signs and symptoms upon arrival at the health service, guidance on preventive measures during care, the use of PPE in all care, the presence of alcohol gel dispensers in health units and checking availability of beds in reference hospitals for treating the disease were variables which showed a statistical difference, pointing to the influence of the type of service on care directed to people with COVID-19.

The identification of symptoms was more prevalent in the *UBS* when compared to the *USF* units, which may be related to the difference in the type of care provided in these services. The *UBS* units work with a larger coverage area and provide more targeted care to address patients' complaints, while the focus of care in the *USF* is health promotion and disease prevention activities. Furthermore, many health units ceased routine care at the beginning of the pandemic, maintaining only remote support, and then they adapted and welcomed patients with respiratory symptoms and resumed pre-pandemic activities as the pandemic progressed.

The lack of identification of respiratory symptoms as a measure to prevent infection by SARS-CoV-2 makes it impossible to previously classify users who will be treated. In this sense, early identification of respiratory symptoms is essential, and it is essential that professionals provide reliable guidance and qualified listening in the first care during the reception and screening of patients suspected of COVID-19¹⁵.

A reorganization of PHC services was necessary during the pandemic, however it was carried out differently in each location; for example, countries such as Belgium, Iceland and the USA created separate environments in services to deal with suspected or confirmed cases of COVID-19. Respiratory symptoms were identified at reception, in addition there was a waiting room and separate offices for suspected users, as well as a restriction on the number of companions and readjustment of services for priority groups who were already being monitored in the health service¹⁶⁻¹⁸.

The system of separating COVID and non-COVID users was also adopted in England, with suspected cases being treated in specific units called Primary Care Centers for COVID-19. Professionals in these places were already prepared to meet this specific demand, with the availability of PPE and necessary supplies to avoid contagion¹¹.

In this study, *UBS* units showed lower adherence to disease preventive measures during patient care. This fact may be related to the fact that *USF* units work in a model in which health promotion activities are routine and part of their work process, while the focus in *UBS* units is on clinical care for patients.

Providing prevention measures to patients and healthcare professionals is necessary to reduce the spread of the disease and prevention actions can only change the population's behavior if they believe that such measures are appropriate to reduce the susceptibility to acquiring the disease, and in turn the risk of dying. Thus, effective communication of prevention measures, as well as adherence by the population, will determine the results achieved¹⁹.

With the advancement of the pandemic and new variants with greater infectivity, such as the Omicron variant, there was an increase in the supply of diagnostic tests. Furthermore, the National Health Surveillance Agency authorized the registration, distribution and commercialization of self-tests for SARS-CoV-2 antigen detection in the same period, expanding access to diagnosis; however, this fact may contribute to the increase in underreported cases, as many oligosymptomatic and asymptomatic patients self-diagnosed and did not seek health services for communication and care^{3,20}.

Underreporting has a negative impact on managers' decision-making, as there is no knowledge of the real epidemiological situation, hindering the definition of control measures^{21,22}. Thus, the importance of reporting all suspected and/or confirmed cases of COVID-19 is highlighted in order to enable longitudinality and coordination of care, as well as to formulate health policies and strategies²³.

In relation to occupational health, health professionals who provide first care to those with respiratory symptoms are at greater risk of contamination, especially during epidemic situations²⁴. Doctors and nurses were the most affected among healthcare professionals during the pandemic, especially female nursing professionals; mortality from the disease was highest among male doctors^{25,26}. Moreover, 80% of nursing professionals who died in Brazil were under 60 years old, while 75% of doctors who died were over 60 years old. These data may be related to working conditions, types of employment relationships, average age at which professionals enter the job market and gender characteristics in each of the professional categories²⁶.

A lack of PPE at the beginning of the COVID-19 pandemic was observed worldwide, and the distribution of some PPE was carried out according to the risk of exposure, as in the case of the N95 mask, recommending its use only when performing aerosol-generating procedures^{23,27}. A study conducted in PHC in the states of São Paulo and Mato Grosso do Sul showed that professionals received PPE unevenly, and despite the majority of participants reporting that they had received a surgical mask, higher education professionals had more access to the N95 mask/PFF2 compared to assistants and technicians²⁸. A similar fact was found in Ceará and Paraíba, where PHC professionals considered the availability of PPE unsatisfactory, with 80% of respondents indicating a 'sufficient quantity' of recommended PPE. The low satisfaction percentages with the amount of PPE stand out, especially for N95 masks (53.43%), protective glasses (54.45%) and disposable aprons (59.42%)²⁹.

In this context, the need for health professionals to know about the use of PPE also stands out, since availability alone does not guarantee that the professional is able to use it correctly, requiring training on proper use and disposal, as well as occupational risks. In addition to protecting the professional, the aforementioned actions impact the quality of care provided and optimization of financial resources¹.

Hand hygiene should be highlighted among the protective measures, as it is considered one of the main disease prevention measures, and is low cost and highly effective. Although this measure had already been recommended prior to the pandemic, many professionals did not perform it appropriately. However, with the advent of COVID-19, hand hygiene began to be widely publicized and carried out; nevertheless, some barriers were found in services such as lack of sinks and supplies such as water and soap³⁰.

An analysis on the relationship between hand washing and the number of daily cases of COVID-19 in 176 countries indicated that this procedure generally reduces the total and new confirmed cases of COVID-19; nevertheless, when this analysis was done non-linearly, it showed that hand washing has an initial effect on reducing the number of cases, but then loses its effect over time³¹.

In addition to adopting protective measures against COVID-19, the care flow organization of patients through the Healthcare Network (*Rede de Atenção à Saúde - RAS*) was essential to make health services dynamic. Nonetheless, knowledge of this flow by health professionals influenced the decision-making process regarding patient referrals. PHC services reinforced their structuring role in the RAS during the pandemic, as the majority of infected users from the beginning of the pandemic developed the mild form of COVID-19 and had to be monitored in PHC.

In this context, the verification of bed availability in reference hospitals for COVID-19 treatment by PHC professionals can be related to the care flow adopted in the municipality. In the case of this study, the health units did not send patients directly to reference hospitals, but to Emergency Care Units. Furthermore, patients treated at health units had a mild to moderate illness, requiring little referral.

Home isolation was recommended for patients with mild COVID-19 symptoms with the aim of reducing community transmission. Home treatment centers were built in Korea for users who showed mild symptoms of the disease. Users were monitored by professionals, and if symptoms worsened, they were referred to hospitals³².

Monitoring of suspected and confirmed cases in the municipality of Sobral (CE, Brazil) was carried out by PHC professionals who were away from their work activities due to belonging to risk groups. Monitoring was carried out daily by telephone for 14 days from the onset of symptoms. If the patient belonged to the risk group or did not have a telephone, this monitoring was performed through a home visit. This monitoring strategy enabled comprehensive monitoring of the population's health conditions, in addition to early identification of new users with respiratory

symptoms, speeding up notification of suspected cases, facilitating contact tracing and expanding access to information on home care measures⁷.

Several scenarios were found during the pandemic regarding the severity of cases, initially the most serious cases were concentrated in the older adult population and people who already had some previous comorbidity^{21,33}. This scenario subsequently changed with the start of vaccination; studies which evaluated mortality from COVID-19 before and after the start of the vaccination campaign showed that patients under 60 years of age had a higher hospitalization frequency in the ICU, an increase in the mortality rate and need for invasive mechanical ventilation after vaccination^{34,35}.

The advancement of vaccination and the introduction of the Omicron variant, which has high infectivity, increased the number of cases to be monitored in PHC, as vaccination reduced the severity of cases which had been manifesting mildly³.

The way PHC health services were organized changed during the pandemic, and initially there was an abrupt interruption in routine care and health education activities; however, over time, it was found that the routine services adopted by PHC were being resumed in a reduced and gradual manner, and often adapted to the moment, reconciling living with the disease and maintaining routine services, building a new normal³⁰.

In this study, it can be noted that the healthcare model exercised by health units influences the organization and care offered to users suspected or diagnosed with COVID-19. The results obtained regarding professionals' knowledge about COVID-19 were positive, although they raised concerns regarding the unavailability of prior training to determine the best care and protection conduct during this context.

Study limitations

The difficulty in collecting data stands out as a study limitation, which began remotely (Whatsapp® and electronic messages via email) in 2021, but adherence was very low due to the pandemic situation at the time. With improvement in the epidemiological scenario, data collection could be completed in person. However, it must be considered that the year 2021 can be considered the worst year of the pandemic due to the higher incidence of the disease and higher numbers of serious cases and deaths, a time when health professionals were overloaded, including in PHC, interfering in joining the study.

It is also considered that it cannot be stated that the instrument completely captured the phenomenon, as it did not go through validation procedures. Nevertheless, despite the difficulty in professionals adhering to the research, this study was innovative and contributed by showing that PHC health services in the city presented distinctions related to the reorganization and care offered during the COVID-19 pandemic, being influenced by the healthcare model adopted in the unit.

CONCLUSION

Given the central role that PHC plays in confronting the pandemic, which is still ongoing, the results of this analysis show the need for managers to identify weaknesses in different health services and direct special attention to carrying out continuing education actions, especially when faced with new scenarios, such as the pandemic experienced.

Finally, it should be noted that we are currently experiencing a different scenario from the time this study was carried out, since health services attend to and monitor cases of COVID-19 in addition to the activities they carried out in the pre-pandemic period, thus pointing to the need for new studies which analyze the learning and challenges of PHC in a COVID-19 control scenario.

REFERENCES

1. Alves ACAP, Barbosa JF, D'Amato TRL, Gonçalves SJC. Atuação do enfermeiro da rede primária em saúde diante do isolamento domiciliar em tempo de COVID-19. *Revista Pró-Universidade*. 2020 [cited 2022 Dec 12]; 11(2):97-101. DOI: <https://doi.org/10.21727/rpu.v11i2.2481>.
2. Medina MG, Giovanella L, Bousquat A, Mendonça MHM, Aquino R, Comitê Gestor da Rede de Pesquisa em Atenção Primária à Saúde da Abrasco. Primary healthcare in times of COVID-19: what to do? *Cad. Saúde Pública*. 2020 [cited 2022 Dec 12]; 36(8):e00149720. DOI: <https://doi.org/10.1590/0102-311X00149720>.
3. Moura EC, Cortez-Escalante J, Cavalcante FV, Barreto ICHC, Sanchez MN, Santos LMP. COVID-19: temporal evolution and immunization in the three epidemiological waves, Brazil, 2020-2022. *Rev Saude Publica*. 2022 [cited 2022 Nov 23]; 56:105. DOI: <https://doi.org/10.11606/s1518-8787.2022056004907>.

4. Dias EG, Ribeiro DRSV. Manejo do cuidado e a educação em saúde na atenção básica na pandemia do Coronavírus. *J Nurs Health*. 2020 [cited 2022 Nov 17]; 10(n.esp.):e20104020. DOI: <https://doi.org/10.15210/jonah.v10i4.19092>.
5. Rodrigues AP, Felipe CR, Lima DB, Costa LRO, Fernandes PF, Silva RPP, et al. Telemonitoramento como estratégia de cuidado longitudinal a grupos prioritários em tempos da COVID-19: uma experiência na atenção primária à saúde do município de Vitória-ES. *APS em revista*. 2020 [cited 2022 Nov 26]; 2:189-96. DOI: <https://doi.org/10.14295/aps.v2i2.100>.
6. Oliveira MAB, Monteiro LS, Oliveira C, Moreira TS, Marques ACF, Silva UMA, et al. A prática do núcleo de apoio à saúde da família do Recife no enfrentamento à pandemia COVID-19. *APS em revista*. 2020 [cited 2022 Dec 18]; 2(2):142-50. DOI: <https://doi.org/10.14295/aps.v2i2.96>.
7. Dorneles JA, Farias RL, Araújo LCF, Rodrigues PV, Queiroz IFR, Silveira GM. Estratégias de monitoramento no enfrentamento da COVID-19 em Sobral-Ceará. *SANARE*. 2021 [cited 2022 Dec 22]; 20: 71-81. DOI: <https://doi.org/10.36925/sanare.v20i0.1534>.
8. Fernandez M, Fernandes L da MM, Massuda A. A atenção Primária à Saúde na pandemia da COVID-19: uma análise dos planos de resposta à crise sanitária no Brasil. *Rev Bras Med Fam Comunidade*. 2022 [cited 2022 Dec 15]; 17(44):3336. DOI: [https://doi.org/10.5712/rbmfc17\(44\)3336](https://doi.org/10.5712/rbmfc17(44)3336).
9. Wyper GMA, Assunção R, Cuschieri S, Devleeschauwer B, Fletcher E, Haagsma JA, et al. Population vulnerability to COVID-19 in Europe: a burden of disease analysis. *Arch Public Health*. 2020 [cited 2022 Dec 11]; 78:47. DOI: <https://doi.org/10.1186/s13690-020-00433-y>.
10. Jacobson NA, Nagaraju D, Miller JM, Bernard ME. COVID Care Clinic: a unique way for family medicine to care for the community during the SARS-CoV-2 (COVID-19) pandemic. *J Prim Care Community Health*. 2020 [cited 2022 Dec 7]; 11:2150132720957442. DOI: <https://doi.org/10.1177/2150132720957442>.
11. Majeed A, Maile EJ, Bindman AB. The primary care response to COVID-19 in England's National Health Service. *J R Soc Med*. 2020 [cited 2022 Nov 26]; 113(6):208-10. DOI: <https://doi.org/10.1177%2F0141076820931452>.
12. Acioli S, David HMSL, Souza IL, Lima MG, Neto M, Rafael RMR, et al. Estratégias de vacinação contra a COVID-19 no Brasil: capacitação de profissionais e discentes de enfermagem. Brasília, DF: Editora ABen; 2021[cited 2022 Nov 24]; p. 5-13. (Série enfermagem e pandemias, 6). DOI: <https://doi.org/10.51234/aben.21.e08.c01>.
13. Lachtim SAF, Elias AL, Lima KJV, Saavedra RC, Trapé CA. COVID-19 e o pacto coletivo em imunização: estratégias, êxitos e desafios do Programa Nacional de Imunizações. In: Silva TMR, Lima MG, (Orgs.). *Estratégias de vacinação contra a COVID-19 no Brasil: capacitação de profissionais e discentes de enfermagem*. Brasília, DF: Editora ABen; 2021 [cited 2022 Nov 26]; p. 31-40. DOI: <https://doi.org/10.51234/aben.21.e08.c04>.
14. Oliveira RM, Volta CS, Santos ACZ, Dilly CNC. Retomada do grupo hiperdia na atenção primária à saúde após dois anos de pandemia: a: relato de experiência. *Expressa Extensão*. 2023 [cited 2022 Dec 17]; 28:166-80. Available from: <https://revistas.ufpel.edu.br/index.php/expressa/article/view/4666>.
15. Belfort IKP, Costa VC, Monteiro SCM. Acolhimento na estratégia saúde da família durante a pandemia da COVID-19. *APS revista*. 2021 [cited 2022 Jan 10]; 3:3-8. DOI: <https://doi.org/10.14295/aps.v3i1.139>.
16. Krist AH, Devoe JE, Cheng A, Ehrlich T, Jones SM. Redesigning primary care to address the COVID-19 pandemic in the midst of the pandemic. *Ann Fam Med*. 2020 [cited 2022 Jan 15]; 18:349-54. DOI: <https://doi.org/10.1370/afm.2557>.
17. Morreel S, Philips H, Verhoeven V. Organisation and characteristics of out-of-hours primary care during a COVID-19 outbreak: a real-time observational study. *PLoS ONE*. 2020 [cited 2022 Jan 22]; 15(8):e0237629. DOI: <https://doi.org/10.1371/journal.pone.0237629>.
18. Sigurdsson EL, Blondal AB, Jonsson JS, Tomasdottir MO, Hrafnkelsson H, Linnet K, et al. How primary healthcare in Iceland swiftly changed its strategy in response to the COVID-19 pandemic. *BMJ*. 2020 [cited 2022 Dec 9]; 10(12):e043151. DOI: <https://doi.org/10.1136/bmjopen-2020-043151>.
19. Carvalho KM, Silva CRDT, Felipe SGB, Gouveia MTO. The belief in health in the adoption of COVID-19 prevention and control measures. *Rev Bras Enferm*. 2021 [cited 2022 Dec 9]; 74:e20200576. DOI: <https://doi.org/10.1590/0034-7167-2020-0576>.
20. Brasil. Ministério da Saúde. Agência Nacional de Vigilância Sanitária. Resolução RDC N° 595, de 28 de janeiro de 2022. 2022 [cited 2022 Nov 26]. Available from: http://antigo.anvisa.gov.br/documents/10181/6386776/RDC_595_2022_.pdf/34db6654-7fc6-487b-bc19-c9784cff7f55.
21. Prado PRD, Gimenes FRE, Lima MVM, Prado VBD, Soares CP, Amaral TLM. Risk factors for death due to COVID-19, in the state of Acre, Brazil, 2020: a retrospective cohort study. *Epidemiol Serv Saude*. 2021 [cited 2022 Jan 9]; 30(3):e2020676. DOI: <https://doi.org/10.1590/s1679-49742021000300018>.
22. Grisotti M. Pandemia de COVID-19: agenda de pesquisas em contextos de incertezas e contribuições das ciências sociais. *Physis*. 2020 [cited 2022 Jan 15]; 30(2):e300202. DOI: <https://doi.org/10.1590/S0103-73312020300202>.
23. Brasil. Ministério da Saúde. Secretaria de Atenção Primária à Saúde. Protocolo de Manejo Clínico do Coronavírus (COVID-19) na Atenção Primária à Saúde - Versão 9. Brasília (DF): Ministério da Saúde; 2020 [cited 2022 Nov 24]. Available from: <https://docs.bvsalud.org/biblioref/2020/05/1095920/20200504-protocolomanejo-ver09.pdf>.
24. Kumar R. Fever, flu and family physicians during COVID 19 pandemic 2020 in India. *J Family Med Prim Care*. 2020 [cited 2022 Jan 24]; 9(4):1781-3. DOI: https://doi.org/10.4103/jfmpc.jfmpc_617_20.
25. Bandyopadhyay S, Baticulon RE, Kadhum M, Alser M, Ojuka DK, Badereddin Y, et al. Infection and mortality of healthcare workers worldwide from COVID-19: a systematic review. *BMJ Glob Health*. 2020 [cited 2022 Jan 13]; 5(12):e003097. DOI: <https://doi.org/10.1136/bmjgh-2020-003097>.
26. Machado MH, Teixeira EG, Freire NP, Pereira EJ, Minayo MCS. Deaths of doctors and nursing staff by COVID-19 in Brazil: a sociological approach. *Ciênc. saúde coletiva*. 2023 [cited 2022 Jan 15]; 28(2):405-19. DOI: <https://doi.org/10.1590/1413-81232023282.05942022>.

27. O'Sullivan ED. PPE guidance for COVID-19: be honest about resource shortages. *BMJ*. 2020 [cited 2022 Jan 09]; 369:m1507. DOI: <https://doi.org/10.1136/bmj.m1507>.
28. Marinho MR, Neto PKS, Mata LRF, Cunha IP, Pessalacia JDR. Perfil dos trabalhadores da Atenção Primária à Saúde e proteção de riscos ocupacionais na pandemia da COVID-19 no Brasil. *Trab. educ. saúde*. 2022 [cited 2022 Jan 11]; 20:e00375195. DOI: <https://doi.org/10.1590/1981-7746-ojs375>.
29. Frota AC, Barreto ICHC, Carvalho ALB, Ouverney ALM, Andrade LOM, Machado NMS. Longitudinal link of the Family Health Strategy at the frontline of the COVID-19 pandemic. *Saúde debate*. 2022 [cited 2022 Jan 15]; 46:131-151. DOI: <https://doi.org/10.1590/0103-11042022E109>.
30. Oliveira WK, Duarte E, França GVA, Garcia LP. How Brazil can hold back COVID-19. *Epidemiol. Serv. Saude*. 2020 [cited 2022 Jan 17]; 29(2):e2020044. DOI: <https://doi.org/10.5123/S1679-49742020000200023>.
31. Dzator J, Acheampong AO, Dzator M, Paolucci F, Yawe BL, Asmah EE, et al. Policy Stringency, Handwashing and COVID-19 cases: evidence from Global dataset. *Health Policy Technol*. 2022 [cited 2022 Jan 17]; 11(2):100574. DOI: <https://doi.org/10.1016/j.hlpt.2021.100574>.
32. Yang Y, Kim H, Hwang J. Quarantine facility for patients with COVID-19 with mild symptoms in Korea: experience from eighteen residential treatment centers. *J Korean Med Sci*. 2020 [cited 2022 Jan 17]; 35(49):e429. DOI: <https://doi.org/10.3346/jkms.2020.35.e429>.
33. Carethers JM. Insights into disparities observed with COVID-19. *J Intern Med*. 2021 [cited 2022 Jan 16]; 289(4):463-73. DOI: <https://doi.org/10.1111/joim.13199>.
34. Braz Junior DS, Costa GJ, Lyra NABe, Viana MMA, Borba VS, Thuler LCS, et al. Mortality rates and epidemiological changes in critically ill Coronavirus Disease 2019 patients after a vaccination program in Brazil. *J Bras Pneumol*. 2022 [cited 2022 Jan 16]; 48(5):e20220268. DOI: <https://doi.org/10.36416/1806-3756/e20220268>.
35. Orellana JDY, Cunha GM, Marrero L, Leite IC, Domingues CMAS, Horta BL. Mudanças no padrão de internações e óbitos por COVID-19 após substancial vacinação de idosos em Manaus, Amazonas, Brasil. *Cad. Saúde Pública*. 2022 [cited 2022 Jan 15]; 38(5):PT192321. DOI: <http://dx.doi.org/10.1590/0102-311XPT192321>.

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Conceptualization, BRGS and SCDAU; methodology, BRGS and SCDAU; software, BRGS and SCDAU; validation, BRGS and SCDAU; formal analysis, BRGS, APVC, HNRP, ACR and SCDAU; investigation, BRGS and SCDAU; resources, BRGS and SCDAU; data curation, BRGS and SCDAU; manuscript writing, BRGS, APVC, HNRP, ACR and SCDAU; manuscript review and editing, BRGS, APVC, HNRP, ACR and SCDAU; visualization, BRGS, APVC, HNRP, ACR and SCDAU; supervision, BRGS, APVC and SCDAU; project administration, BRGS and SCDAU; financial acquisition, BRGS and SCDAU. All authors have read and agreed to the published version of the manuscript.