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ORIGINAL ARTICLE

The Social Determinants of Health in the planning of COVID-19 testing in Amazonas, Brazil

Os Determinantes Sociais da Saúde no planejamento da testagem à covid-19 no Amazonas, Brasil

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ABSTRACT The COVID-19 syndemic has disproportionately affected socially vulnerable populations, such as low-income individuals, Indigenous peoples, and riverine communities. Social Determinants of Health (SDH) have played a crucial role in the state of Amazonas, where unique geography and social disparities pose significant challenges to health access and equity. This article examines whether and how SDH were considered during COVID-19 testing planning in Amazonas. For this analysis, we conducted a qualitative case study through document analysis and semi-structured interviews with key stakeholders involved in testing planning and implementation. Official documents were systematized using TIDieR-PHP, and data were analyzed using the REFLEX-ISS tool. SDH were not considered in testing planning in Amazonas. The respondents could not all agree on the importance of considering SDH in intervention planning. Testing was limited to patients with severe symptoms and specific categories of essential workers. Health policymakers need to understand the relevance of considering SDH in planning population interventions to ensure equitable policy implementation.

KEYWORDS COVID-19. Health planning. Health policy. Social Determinants of Health.

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RESUMO *A sindemia da covid-19 afetou desproporcionalmente populações mais vulneráveis do ponto de vista social, como pessoas de baixa renda, populações indígenas e ribeirinhas. No estado do Amazonas, onde a geografia única e as disparidades sociais apresentam desafios significativos para o acesso e a equidade em saúde, os Determinantes Sociais da Saúde (DSS) desempenham um papel crucial. Este artigo analisa se e como os DSS foram considerados durante o planejamento de testes para a covid-19 no Amazonas. Para tal análise, realizou-se um estudo de caso qualitativo por meio de análise documental e entrevistas semiestruturadas com atores-chave envolvidos no planejamento e na implementação da testagem. Os documentos oficiais foram sistematizados usando TIDieR-PHP. Os dados foram analisados empregando a ferramenta REFLEX-ISS. Os DSS não foram considerados no planejamento de testes no Amazonas. Não houve consenso entre os entrevistados sobre a importância de considerar os DSS no planejamento da intervenção. Os testes foram restritos a pacientes com sintomas graves e a algumas categorias de trabalhadores em serviços considerados essenciais. Faz-se necessário, aos gestores de políticas de saúde, conhecimento sobre a importância de considerar os DSS no planejamento em intervenções populacionais para realizar uma política equânime.*

PALAVRAS-CHAVE *Covid-19. Planejamento em saúde. Política de saúde. Determinantes Sociais da Saúde.*

Introduction

Several preventive public health measures have been implemented due to the rapid spread of COVID-19 across all continents[1]. One of the main measures to contain the transmission of SARS-CoV-2 was implementing mass testing, which detects cases and provides for their subsequent isolation[2]. Population testing strategies have varied between countries and pandemic stages. It was initially widely accessible in Asian countries due to their previous experience with other respiratory epidemics[3,4]. However, in other countries, due to the novel situation, population size, lack of testing supply, or government priorities, testing was restricted to people with severe symptoms, those with contact with a confirmed case, and people from the high-risk exposure group[5].

Like other diseases, COVID-19 is associated with Social Determinants of Health (SDH), that is, social, economic, cultural, ethnic/racial, psychological, and behavioral factors that influence the emergence of health problems and their risk factors in the population[6]. Studies indicate that differences in SDH are the underlying factors behind the disparities in the spread of COVID-19[7,8]. Furthermore, several global studies have assessed the extent of inequalities linked to the COVID-19 pandemic[9–11]. Given these characteristics of inequalities, scholars have been classifying the current COVID-19 pandemic as a syndemic, considering a link between the determinants of the disease – such as social, economic, and cultural contexts – and the interaction of two or more diseases[12,13].

This syndemic in Brazil occurs in the context of fragile social systems, unequal distribution of the high burden of comorbidities, political and economic crises, setbacks in environmental policies, and discredited science[14], which has further exacerbated existing inequalities[15]. As a result, following fundamental public health measures continues to be challenging due to reduced access to essential supplies for health, hygiene, and protection[16]. This national problem was exacerbated in Amazonas during the first (May to July 2020) and second (January to March 2021) COVID-19 syndemic waves[17,18]. Considerations related to planning public health interventions and those associated with tackling health inequalities are essential[19]. In this study, planning is seen as a tool that facilitates the achievement of expected objectives, focusing on access to health services[20].

Given this context, it is essential to analyze how and whether the SDH were addressed in planning population testing for COVID-19 in the state of Amazonas. The data from this study provide knowledge that facilitates the planning of future public policies in a rational, more impactful way, whose main result is a policy based on proportional universality. Thus, social inequalities in health would be reduced[21].

Material and methods

Study design

This single case study[22] examines the planning of population testing for COVID-19 in Amazonas using a qualitative approach through documentary research and semi-structured interviews. This research is nested in the public health component of the international HoSPiCOVID research project, which explores the resilience of public health systems[23]. The SRQR checklist was used to present the topics of this study.

Research team characteristics and reflexivity

This research involved the contribution and interaction of a team of researchers that included diversity regarding gender, nationality, experience (junior and senior), and discipline

(sociology and public health). The researchers responsible for the interviews are active in health research in Brazil, which facilitated access to stakeholders involved in managing the response efforts to the syndemic. None of the authors participated in the public health response to the syndemic.

Context

The study was conducted in the state of Amazonas, in the Brazilian northern region. It is the largest Brazilian state, with one of the lowest population density rates in the country. For geographical reasons, most of the municipalities in the state have exclusive river access[24]. The distance between municipalities, the demographic dispersion, and the large territory with extensive river basins associated with the coverage of the largest tropical forest on the planet impose significant inequalities in access to health against other Brazilian regions[25]. We will exclusively address the state government's actions via the Amazonas State Health Secretariat (SES-AM) and the Amazonas State Health Surveillance Foundation (FVS-AM) for this study.

Sampling strategy

The participants for this study were selected in two stages. The first respondent was chosen through purposeful sampling based on the criterion of participation in the planning process and direct action in the testing intervention. From there, we targeted other stakeholders involved in testing through a snowball strategy. In the end, we achieved the sample by data saturation, in which we staged individual interviews with 11 key stakeholders (*table 1*) who worked in rapid and RT-PCR testing. Nine had some employment relationship with the public service (universities and surveillance foundation), and two had unpaid employment relationship.

Table 1. Respondent's profile

Respondent	Education	Role in the Testing Policy
Respondent 1 (E1)	Pharmacy Graduate, Master and Ph.D. in Infectious and Parasitic Diseases	Manager/RTC volunteer
Respondent 2 (E2)	Pharmacy undergraduate	Assistant work/RTC volunteer
Respondent 3 (E3)	Nursing graduate, Epidemiology specialist	Manager
Respondent 4 (E4)	Pharmacy Graduate, Master in Food Technology and Ph.D. in Pharmacology	Assistant work /RTC volunteer
Respondent 5 (E5)	Pharmacy Graduate, Master and Ph.D. in Natural Products	Assistant work /RTC volunteer
Respondent 6 (E6)	Pharmacy undergraduate	Assistant work /RTC volunteer
Respondent 7 (E7)	Dentistry Graduate, Master and Ph.D. in Endodontics	Manager/RTC volunteer work
Respondent 8 (E8)	Pharmacy Graduate, Epidemiology and Public Health specialist	Manager
Respondent 9 (E9)	Pharmacy Graduate	Manager
Respondent 10 (E10)	Dentistry Graduate, Master and Ph.D. in Dental Clinic	Assistant work /RTC volunteer
Respondent 11 (E11)	Pharmacy Graduate, Clinical Analysis, Hematology, and Pharmaceutical Care specialist	Manager/RTC volunteer

Source: Own elaboration, 2022.

Data collection methods

The in-depth interviews were held between February and May 2021, using a semi-structured roadmap developed in collaboration with the country teams involved in the public health component of the HoSPiCOVID project and tested in pilot interviews[26].

The data collection guide and the categorization of results were developed based on components selected from REFLEX-ISS[26]. This tool guides reflection on the best way to address health equity, establishing an analysis grid with questions regarding the planning, implementation, and evaluation of public health interventions[27]. In this sense, only the components related to planning were used (*table 2*).

Three categories contained in the REFLEX-ISS planning component supported the roadmap and analysis. The first refers to the analysis of problems and needs; that is, understanding how testing was conceived, whether the SDH were considered and different subgroups of the affected population were described and defined in the planning. This part also addressed the availability of human and material resources for testing planning. The second category includes the intervention's objectives, rationale, and design. In this section, we observed how the planning was designed, what scientific references supported the intervention, and whether the intervention proposes various activities to meet the different needs of the subgroups of the affected population. The third category addresses intersectoral partnerships and the participation of the target population. Here, the questions addressed whom the main intersectoral partners were, under what circumstances the partnership occurred, and their contributions to the planning design and related issues. The participants were asked about the population's participation that would benefit from the testing to understand their needs and challenges.

Furthermore, the roadmap also aimed to understand the educational and professional background of the respondents in order to identify possible correlations between their education, professional experience, and perspectives vis-à-vis the SDH. Finally, the roadmap focused on the planning challenges and suggestions for changes in the case of the need to plan a new testing intervention under analogous conditions.

The questions referred to 2020, as it was the initial year of the syndemic in Amazonas when it was declared a public health emergency, and because it was when the testing plan was drawn up. The interviews lasted, on average, 60 minutes. They were recorded and later transcribed.

Table 2. Analytical planning categories (REFLEX-ISS tool adapted for the HoSPiCOVID research project)

Analytical categories	Planning
Category 1	Problem and needs analysis / SDH vision / Data used for planning
Category 2	Objectives, justification, and design of actions/type of approach to address SDHs
Category 3	Partner and target audience engagement

Source: Own elaboration based on the REFLEX-ISS tool[27].

The documentary research was conducted in official documents (ordinances, technical notes, bulletins, protocols, contingency plans, and reports) issued between January and November 2020, with the theme of COVID-19 on the official websites of FVS-AM and SES-AM. Only the documents that addressed testing were selected after reading.

The systematization was performed by the TIDieR-PHP[28] tool, which provides the necessary guidelines for understanding and describing public health interventions in detail through systematization. The data obtained in this document systematization allowed us to supplement the necessary and relevant information about the planning process.

Data analysis

We performed content analysis from the Bardanian perspective[29] based on the categories established in the REFLEX-ISS explained above. Moreover, some categorizations emerged from inductive analysis. The Nvivo software was adopted for coding and subsequent identification and classification of the most relevant speech extracts.

Ethical issues

All ethical issues were carefully respected in this study. All the participants signed the Informed Consent Form. Furthermore, a letter of consent was obtained from SES-AM and FVS-AM. The National Research Ethics Commission (CONEP) assessed and authorized the study under Opinion Nº 4.018.111 on October 28, 2020.

Results

Contrasting views on SDH

Regarding testing planning in the state of Amazonas, the statements were contradictory, as there was no consensus on planning due to the urgent demand.

> *There was no planning for much of anything. It was an urgent issue that had to be answered here [...] Testing actions were not guided at any time [...] Actions were instead based on what we were seeing as urgent rather than on an actual scientific basis, which means that, as I see this is urgent, I will do it now.* (E1, CTR Management).

Before COVID-19 arrived in Amazonas in February 2020, with the creation of the Interagency Committee for Public Health Emergency Management, tests were only used on hospitalized patients with severe conditions due to shortages. Local authorities did not consider SDH. The first COVID-19 case was confirmed in Amazonas on March 13, 2020. The competent agencies joined forces to report this case. This alignment reflected the intention of the Amazonas state planning to work together with all levels of action (national, state, and municipal). However, during the period studied, the state management centralized the testing process at FVS-AM, covering a restricted population: workers in essential services and patients admitted to reference hospitals concentrated in the capital.

Evidence suggests that the testing process had a low capacity to anticipate problems. Its first actions were already designed as reactions to prevailing problems, notably to diagnose frontline health professionals rapidly becoming infected with the new disease. There was no shared view regarding SDH. Some participants believed SDH could not be considered due to the shortage of rapid tests, and healthcare workers were prioritized to ensure care continuity.

> *There was indeed inequality, but it was due to a lack of material at that time. Tests were very scarce at the beginning and very expensive. Almost no one could afford them. [...] The government preferred to start with the frontline health professionals.* (E2, CTR Volunteer).

Some are unsure whether social inequalities acted as health determinants in the novel coronavirus syndemic:

> *I did not see the issue that* [COVID-19] *is affecting people with low incomes more than other clientele or social groups. I think the impact is the same [...].* (E3, FVS Management).

Other respondents considered that SDH were risk factors for exposure and that they should have been prioritized in planning:

> *I do not know if you had access to a letter I signed [...] pointing out to the competent authorities that receiving less than three minimum wages in a city like Manaus is a risk factor for acquiring the infection. Therefore, I think that this approach is essential for a policy that is still current because the pandemic is not over.* (E1, CTR Management).

Despite contrasting views on SDH, Rapid Testing Centers (CTR) planning did not consider socially vulnerable individuals or those with comorbidities. The selection of priority groups for testing was based on occupational exposure to the virus for the working classes. Thus, the general population only had access to testing when admitted to reference hospitals, requiring them to be in severe conditions.

Some stakeholders stated that there was no epidemiological data to support this. Thus, prioritizing healthcare professionals for testing was due to absenteeism during workdays. In terms of scientific literature, the planning aimed to adapt testing protocols for other infections to the COVID-19 circumstances, besides not considering the SDH-geared literature.

Crisis operationalization

Due to insufficient testing material, testing was restricted to seriously ill hospitalized patients and specific categories of essential workers treated at the implemented CTRs (*table 3*). There were no state government actions to test the general population during part of the period studied (April to November 2020).

Table 3. Testing centers and target audience

Rapid Testing Center (RTC)	Target audience
RTC 1 – Federal University of Amazonas – Nursing School	Initially, symptomatic health professionals. Later, health professionals in general. Finally, education professionals.
RTC 2 – Fire Department	Public security agents: civil defense, federal police, and military police.
RTC 3 – Military Police Command	Military personnel and their dependents.
RTC 4 – Federal University of Amazonas – drive-through	Health professionals.
RTC 5 – Manaus Convention Center (Sambadrome)	Education professionals.

Source: Own elaboration, 2022.

O primeiro CTR no Amazonas foi implemThe first CTR in Amazonas was implemented in April 2020, exclusively for symptomatic health professionals working to combat COVID-19. It was implemented as a matter of urgency to address the high number

of respiratory syndromes among health professionals who had not been tested.

> *Regarding rapid testing for healthcare professionals, there was a huge need for professionals to test at that time. [...] Many healthcare professionals were already sick with COVID-19, with symptoms, and away from their jobs. [...] It didn't take three days because everything was urgent, right? I believe that the testing center would be open within 24 to 48 hours at the most.* (E1, CTR Management).

CTR-1 was opened at the School of Nursing of the Federal University of Amazonas (UFAM), with volunteers from health professors and students, mainly from Pharmacy. It aimed to test symptomatic frontline health professionals fighting against COVID-19 and

> *minimize harm [...] because those health professionals cared for sick people. Therefore, we needed to have a different look at these professionals.* (E3, FVS Management).

CTR-2 was installed at the Fire Department headquarters to serve public safety professionals. Then, CTR-3 was created at the Military Police headquarters, geared to military personnel. Both centers were justified by the need to test these workers who continued to work during the syndemic. Furthermore, such locations were deemed convenient because they had a structure: professionals and equipment to act as a center, requiring only testing materials as resources to carry out the tests made available by the Ministry of Health and the State government.

Due to high demand and crowding at CTR-1, FVS-AM implemented CTR-4, with support from UFAM, intended for health professionals. Access was via drive-through to reduce the risk of infection. Finally, to reopen schools in August 2020, CTR-5 was implemented to test education professionals in the state public network.

CTRs were not distributed geographically and equitably, as they were all located in the city's central neighborhoods, according to the availability of these spaces. Territories with more vulnerable and peripheral populations were not considered in the planning. The CTRs were implemented per the resources available in these locations.

Collaborations and partnerships

Testing in Amazonas has occurred through several partnerships since the onset of the intervention. Establishing collaborations between public and private institutions was necessary to strengthen laboratory surveillance in participatory and decentralized planning. The rapid tests offered by the CTRs and the RT-PCR tests managed by the Central Public Health Laboratory of the Amazonas State Health Surveillance Foundation (LACEN/FVS-AM) were made available to hospital patients.

Processing and diagnosis of biological samples was decentralized to expand RT-PCR testing capacity in Amazonas, which was achieved through the participation of the private laboratory network and the public network through the Dr. Heitor Vieira Dourado Tropical Medicine Foundation and the Oswaldo Cruz Foundation (FIOCRUZ Amazônia). Moreover, a partnership was established with the National Institute for Amazonian Research through equipment supply to LACEN/FVS-AM for processing tests. The state government also invested in purchasing equipment that allowed for the expansion of RT-PCR tests and accessibility.

> *We contacted the Federal University of Amazonas, and the professor there would choose and refer the doctoral students. Therefore, everyone came as volunteers: doctoral students, master's students, who were working specifically in molecular biology in other diseases, in other situations, but they came here. People from the Tropical Medicine Foundation also came and even donated equipment because we didn't have the equipment to meet this demand [...] we didn't have the professionals for that. People*

> *from Hemoam also came, along with people from the Alfredo da Mata and the Municipal Secretariat.* (E9, Management of the Central Public Health Laboratory of Amazonas).

We observed an expanded dynamic regarding the intervention's 'partner' organizations. A partnership with universities was essential for implementing the CTRs in Amazonas, providing physical space, equipment, and personnel. Because they were from different technical areas and postgraduate studies in health sciences, they occupied different positions, such as CTR coordination, screening, reading tests, and disseminating results. The profiles of the stakeholders involved varied per their previous expertise. In this outlook, we see professionals with previous experience in testing for sexually transmitted infections and vaccination campaigns, especially those linked to the university.

Volunteers played a prominent role in the CTR and LACEN/FVS-AM. The implementation of the intervention was facilitated by the massive mobilization of volunteers, including several hundred students and young professionals. Moreover, social mobilization was reported through food donations from restaurants and cafes to professionals involved in testing.

Discussion

In this study, we noticed inadequate planning for COVID-19 testing in the state of Amazonas in two aspects. The first, central to this research, is that the SDH were not considered in the testing design. The FVS-AM, responsible for coordinating the planning of COVID-19 testing in the state, began to design the model for the first CTRs in response to the shortage of frontline healthcare professionals infected with the disease. The planning was elaborated to meet this urgency and used mainly documents focused on the logistics of the CTRs in order to prevent and control the spread of COVID-19 in the testing space. The need for an urgent response to this infection does not justify not resorting to scientific literature, which shows the importance of addressing SDH in dealing with highly contagious acute diseases, which would allow us to act more effectively[30].

Knowledge of previous international epidemics, such as H1N1, SARS, Ebola, and the Brazilian experiences with dengue, tuberculosis, and HIV/AIDS show the relationship between incidence and mortality rates related to vulnerable populations[18]. These data could have been used to plan testing with particular attention to the most vulnerable populations with a greater risk of spreading the disease because they are at greater risk of becoming infected.

Given that SDH are determining factors in the health-disease process, universal health policies must adopt initiatives to enable access for vulnerable populations[31]. Within this logic, for example, the Cuban government implemented universal and free coverage since the beginning of the pandemic, in which the most significant resources were distributed to populations with the worst socioeconomic situations, ensuring a more equitable health policy[32].

As noted, in Amazonas, the SDH were not considered in the planning process for COVID-19 testing. Furthermore, vulnerabilities linked to economic and ethnic-racial dimensions were disregarded. This situation becomes particularly troubling considering that Amazonas is the state with the most significant economic inequality in the country[18] and that it concentrates traditional populations, such as Indigenous and riverine communities, particularly vulnerable to COVID-19[33-35].

In 2020, the World Health Organization (WHO) expressed concern about the impact of the COVID-19 syndemic on at-risk populations, such as the Indigenous peoples of the Brazilian Amazon, based on the vulnerability of this population to new infectious agents and the characteristics of their specific and heterogeneous immune response[33]. Besides the

immunological aspects, the community's way of life and the difficult access to health services aggravate this population's vulnerability[34]. Although there is a clear need for actions to meet the specific needs of Indigenous populations, this concern has not been adequately addressed.

In addition to the Indigenous population, Amazonas has a specific population of riverine communities, who were also not included in the planning of the testing policy. Riverine communities live near the Amazon region's rivers and mainly depend on fishing and subsistence farming[36]. This population has predominantly low schooling level and income. It lacks road access, basic sanitation, and electricity and has logistical problems. These characteristics hamper access to health services, making specific strategies necessary for this population to access such facilities[37].

Concentrated in the capital, Manaus, the CTRs were unavailable to other municipalities in the state during the period studied. This measure prevents the population living in the inland regions from accessing the tests, showing inequality when comparing access in the capital with other municipalities in the state. The Amazonas state is known for its vast territorial extension, covered by extensive river basins, causing a significant distance between the municipalities in the inland region and the capital. Often, this travel occurs only by river or air, aggravating the problem of access to health services and other social distortions regarding other Brazilian regions[37,38].

The decentralized testing model is a fundamental strategy for preventing the increase in new cases through linkages with adequate care and epidemiological surveillance. However, we observed barriers in socioeconomic inequalities and the distribution of equipment and infrastructure available for diagnosis[39].

Within the capital, the CTRs were also not distributed across the city's several geographic locations, ignoring vulnerable populations. Testing could have been decentralized through Family Health Units, designed to provide geographically decentralized primary care, allowing and facilitating access to testing for populations living in more vulnerable neighborhoods, thus reducing transmission, as observed in other countries[40,41].

The lack of national coordination was the second inadequate aspect in planning COVID-19 testing in Amazonas. Due to recommendations seen as lacking scientific basis, such as the widespread use of chloroquine and hydroxychloroquine in the treatment of COVID-19, the Brazilian Ministry of Health clashed with the governors of several states, which led to the decision of the Supreme Federal Court to grant autonomy to the States to take regulatory and administrative measures related to COVID-19[42]. However, there was a lack of robust national protocols to guide the surveillance, prevention, and control of the new infection.

The strategy adopted by the state of Amazonas prioritizes frontline healthcare workers in the fight against the pandemic for testing, considering them a particularly vulnerable group due to occupational exposure to the virus. Public sector workers in essential services continued to work even at the peak of the pandemic's contamination, deprived of quarantine and social distancing, the primary means of protection against the virus[43].

This occupational exposure to SARS-CoV-2 generates a type of contextual inequality that was prioritized in testing to help ensure the continuity of these essential services[44]. Testing this group allows for greater agility in recomposing the workforce since those who test negative for COVID-19 would return to work more quickly.

Concerning healthcare workers, this measure corroborates the WHO recommendations that recommend investigating COVID-19 cases among healthcare professionals, and early detection and infection control among healthcare teams[45]. This measure was also adopted in countries such as the

United Kingdom, which, under pressure from unions, began prioritizing testing healthcare professionals considering their exposure to contamination[46].

However, even though testing at CTRs focused on essential service workers, it was initially only aimed at those with symptoms. In this specific case, testing diagnoses the disease only and does not fulfill the fundamental role of interrupting the virus transmission chain. To this end, there would be no need to import many tests but rather to use them appropriately[30]. We should underscore the successful experiences observed in countries that adopted mass population testing and were more successful in controlling the transmission of SARS-CoV-2 through this measure[47,48].

Establishing partnerships with institutions and universities and supporting voluntary work and social mobilization was necessary to implement the CTRs and expand the technical capacity to run RT-PCR. Although these data attest to the fragility of the health system and its lack of human resources to address COVID-19, the expansion of technological capacity through the support of private laboratories and universities is defended as a good alternative in response to the pandemic[45]. Moreover, volunteer work was a solution found as a quick response to the demand at that time[49,50].

Conclusions

Although social vulnerability was an aggravating factor for the COVID-19 syndemic, the SDH were not considered in planning the testing policy in the state of Amazonas. Low-income and traditional populations of the state living in vulnerable situations, such as the Indigenous and riverine populations, were disregarded in the planning. We should underscore that the study was limited to the planning phase of testing in the state of Amazonas, highlighting the need for future studies to address the intervention's implementation and evaluation. Furthermore, the emphasis was on the state government's actions, and it is relevant to investigate subsequent municipal actions. On another note, scheduling interviews with key stakeholders was challenging due to the crisis context. During the pandemic, priority groups were selected based on criteria of vulnerability to exposure to SARS-CoV-2 and those with severe symptoms of the disease. These criteria were based on contextual inequality imposed by the impossibility of taking some of the most crucial protective measures at the time: quarantine and social distancing. Therefore, health policy managers and planners must know the importance of considering inequalities and SDH when planning these interventions to provide an equitable policy.

Collaborators

Nóbrega R (0000-0001-9397-467X)* contributed to data analysis, drafting, critical review, and final approval of the manuscript. Medeiros S (0000-0003-3039-6272)* contributed to data categorization and analysis, drafting and critical review of the manuscript. Zinszer K (0000-0003-1388-1145)*, Gautier L (0000-0002-9515-295X)* and Ridde V (0000-0001-9299-8266)* contributed to the conception, planning and critical review of the manuscript. Oliveira S (0000-0002-6349-2917)* contributed to the analysis and final review of the manuscript. ■

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References

1. Ortelan N, Ferreira AJF, Leite L, et al. Máscaras de tecido em locais públicos: intervenção essencial na prevenção da COVID-19 no Brasil. Ciênc. saúde coletiva. 2021; 26(2):669-692.

2. Yoo KJ, Kwon S, Choi Y, et al. Systematic assessment of South Korea's capabilities to control COVID-19. Health Policy. 2021; 125(5):568-576.

3. Red Argentina Pública de Evaluación de Tecnologías Sanitarias. Diferentes tipos de tests y estrategias diagnósticas en el contexto de pandemia por COVID-19. Red Argentina Pública de Evaluación de Tecnologías Sanitarias. [local desconhecido]: RedARETS; 2020.

4. Cohen J, Kupferschmidt K. Countries test tactics in 'war' against COVID-19. Science. 2020; 367(6484):1287-1288.

5. Pilecco FB, Coelho CG, Fernandes QHRF, et al. O efeito da testagem laboratorial nos indicadores de acompanhamento da COVID-19: uma análise dos 50 países com maior número de casos. Epidemiol. Serv. Saúde. 2021; 30(2):e2020722.

6. Buss PM, Pellegrini Filho A. A saúde e seus determinantes sociais. Physis. 2007; 17(1):77-93.

7. Yancy CW. COVID-19 and African Americans. JAMA. 2020; 323(19):1891.

8. Khalatbari-Soltani S, Cumming RG, Delpierre C, et al. Importance of collecting data on socioeconomic determinants from the early stage of the COVID-19 outbreak onwards. J. Epidemiol. Community Health. 2020; 74(8):620-623.

9. Bekele BB, Alhaffar BA, Wasnik RN, et al. The effect of the COVID-19 Pandemic on the social inequalities of health care use in Hungary: a nationally representative cross-sectional study. IJERPH. 2022; 19(4):2258.

10. Antonio-Villa NE, Fernandez-Chirino L, Pisanty-Alatorre J, et al. Comprehensive evaluation of the impact of sociodemographic inequalities on adverse outcomes and excess mortality during the Coronavirus Disease 2019 (COVID-19) Pandemic in Mexico City. Clin. Infect. Dis. 2022; 74(5):785-792.

11. Dalsania AK, Fastiggi MJ, Kahlam A, et al. The relationship between social determinants of health and racial disparities in COVID-19 mortality. J. Racial and Ethnic Health Disparities. 2022; 9(1):288-295.

12. Horton R. Offline: COVID-19 is not a pandemic. Lancet. 2020; 396(10255):874.

13. Bispo Júnior JP, Santos DB. COVID-19 como sindemia: modelo teórico e fundamentos para a abordagem abrangente em saúde. Cad. Saúde Pública. 2021; 37(10):e00119021.

14. Hallal PC. SOS Brazil: science under attack. Lancet. 2021; 397(10272):373-374.

15. Marmot M, Allen J. COVID-19: exposing and amplifying inequalities. J. Epidemiol. Community Health. 2020; 74(9):681-682.

16. Minayo MCS, Freire NP. Pandemia exacerba desigualdades na Saúde. Ciênc. saúde coletiva. 2020; 25(9):3555-3556.

17. Lavor A. Amazônia sem respirar: falta de oxigênio causa mortes e revela colapso em Manaus. RADIS. 2021; 221:20-23.

18. Demenech LM, Dumith SC, Vieira MECD, et al. Desigualdade econômica e risco de infecção e morte por COVID-19 no Brasil. Rev. Bras. Epidemiol. 2020; 23:e200095.

19. Mathevet I, Ost K, Traverson L, et al. Accounting for health inequities in the design of contact tracing interventions: A rapid review. Int. J. Infect. Dis. 2021; 106:65-70.

20. Jesus WLAD, Assis MMA. Revisão sistemática sobre o conceito de acesso nos serviços de saúde: con-

tribuições do planejamento. Ciênc. saúde coletiva. 2010; 15(1):161-170.

21. Francis-Oliviero F, Cambon L, Wittwer J, et al. Desafíos teóricos y prácticos del universalismo proporcional: una revisión. Rev. Panam. Salud Publica. 2021; 45:e102.

22. Yin R. Case study research: design and methods. 5. ed. Thousand Oaks: Sage; 2013.

23. Ridde V, Gautier L, Dagenais C, et al. Learning from public health and hospital resilience to the SARS--CoV-2 pandemic: protocol for a multiple case study (Brazil, Canada, China, France, Japan, and Mali). Health Res. Policy Sys. 2021; 19(1):76.

24. Medeiros LT, Sousa AM, Arinana LO, et al. Mortalidade materna no estado do Amazonas: estudo epidemiológico. Rev. Baiana Enferm. 2018; e26623.

25. Nóbrega RED, Reis RS, Xavier FAS, et al. O desafio da Saúde Bucal ribeirinha: um relato de experiência na Amazônia. In: Schweickardt JC, organizador. A Atenção Básica num território em movimento: diálogos necessários sobre a política. Porto Alegre: Editora Rede Unida; 2021. p. 119-33.

26. Savard Lamothe A, Gabet M, Richard Z, et al. A descriptive comparison of mass testing during the COVID-19 Pandemic in Montreal, Paris, Bamako, and Recife. Int. J. Public Health. 2022; 67:1604992.

27. Guichard A, Hébert C, Nour K, et al. Adaptation et conditions d'utilisation d'un outil d'analyse des interventions au regard des inégalités sociales de santé. Santé Publique. 2018; S1(HS1):121.

28. Campbell M, Katikireddi SV, Hoffmann T, et al. TIDieR-PHP: a reporting guideline for population health and policy interventions. BMJ. 2018; k1079.

29. Bardin L. Análise de Conteúdo. Rio de Janeiro: Edições 70; 2015.

30. Silveira MC, Costa EA. Busca ativa ou testagem em massa? Cad. Ibero Am. Direito Sanit. 2020; 9(4):188-191.

31. Ost K, Duquesne L, Duguay C, et al. Large-scale infectious disease testing programs have little consideration for equity: findings from a scoping review. Journal of Clinical Epidemiology. J. Clin. Epidemiol. 2022; 143:30-60.

32. Mas Bermejo P, Sánchez Valdés L, Somarriba López L, et al. Equity and the Cuban National Health System's response to COVID-19. Rev. Panam. Salud Publica. 2021; 45:1.

33. Brito PL, Souza LSSD, Gomes PHC, et al. Infecção pela Covid-19 em populações indígenas no Amazonas. Acervo Saúde. 2023; 23(3):e12255.

34. Mendes MF, Pereira LR, Lima TM, et al. COVID-19 pandemic evolution in the Brazilian Indigenous population. J. Racial and Ethnic Health Disparities. 2022; 9(3):921-937.

35. Rodrigues EPS, Abreu IN, Lima CNC, et al. High prevalence of anti-SARS-CoV-2 IgG antibody in the Xikrin of Bacajá (Kayapó) indigenous population in the Brazilian Amazon. Int. J. Equity Health. 2021; 20(1):50.

36. Moreira Domingos I, Miranda Gonçalves R. População ribeirinha no Amazonas e a desigualdade no acesso à saúde. RECHTD. 2019; 11(1):99-108.

37. Guimarães AF, Barbosa VLM, Silva MP, et al. Acesso a serviços de saúde por ribeirinhos de um município no interior do estado do Amazonas, Brasil. Rev. Pan--Amaz. Saude. 2020; 11:e202000178.

38. Figueiredo Júnior AM, Lima GLOG, Vilela KAD, et al. O acesso aos serviços de saúde da população ribeirinha: um olhar sobre as dificuldades enfrentadas. REAC. 2020; 13:e4680.

39. Magno L, Rossi TA, Mendonça-Lima FW, et al. Desafios e propostas para ampliação da testagem e diagnóstico para COVID-19 no Brasil. Ciênc. saúde coletiva. 2020; 25(9):3355-3364.

40. Raffle AE, Pollock AM, Harding-Edgar L. Covid-19 mass testing programmes. BMJ. 2020; m3262.

41. Burki T. Mass testing for COVID-19. Lancet Microbe. 2020; 1(8):e317.

42. Vieira FS, Servo LMS. Covid-19 e coordenação federativa no Brasil: consequências da dissonância federal para a resposta à pandemia. Saúde debate. 2020; 44(esp4):100-113.

43. Helioterio MC, Lopes FQRS, Sousa CC, et al. Covid-19: Por que a proteção de trabalhadores e trabalhadoras da saúde é prioritária no combate à pandemia? Trab. Educ. Saúde. 2020; 18(3):e00289121.

44. Gallasch CH, Cunha ML, Pereira LAS, et al. Prevenção relacionada à exposição ocupacional do profissional de saúde no cenário de COVID-19. Rev. Enferm. UERJ. 2020; 28:e49596.

45. Albuquerque NLS. Planejamento operacional durante a pandemia de COVID-19: comparação entre recomendações da Organização Mundial de Saúde e o Plano de Contingência Nacional. Cogit. Enferm. 2020; 25:e72659.

46. Churchill F. Unions call for essential workers to be given priority amid rapid test shortage. People Management. 2021 dez 10. [acesso em 2021 dez 21]. Disponível em: https://www.peoplemanagement.co.uk/news/articles/unions-call-essential-workers-given-priority-amid-rapid-test-shortage#gref.

47. Freire-Silva J, Ferreira HS, Candeias ALB, et al. A utilização do planejamento territorial no combate da COVID-19: considerações sobre a situação dos leitos nos municípios de Pernambuco, Brasil. Visa em Debate. 2020; 8(2):16-27.

48. Bittencourt RJ. Testagem de rastreio e busca ativa de infectados assintomáticos pelo SARS-COV-2: a visão do planejamento em saúde pública. Com. Ciências Saúde. 2020; 31:07-15.

49. Kabad JF, Noal DS, Passos MFD, et al. A experiência do trabalho voluntário e colaborativo em saúde mental e atenção psicossocial na COVID-19. Cad. Saúde Pública. 2020; 36(9):e00132120.

50. Lopes SC, Leite KFS, Pereira Jr RR, et al. Produção de máscaras cirúrgicas e aventais descartáveis para profissionais da saúde em cenário de restrição de recursos decorrentes da pandemia por SARS-COV-2. Braz. J. Infect. Dis. 2021; 25:101127.

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