University integration and epidemiological surveillance in fighting Covid-19

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ABSTRACT
Mass testing of the population is a strategy to face the Covid-19 pandemic, as it allows knowing the situation of transmission of the virus, to design policies for action. However, the few existing tests in health services were available only for severe cases and for health professionals, especially in the first months of the pandemic. In Santa Maria, starting in June, rapid tests were made available free of charge. However, the Municipal Health Department of Santa Maria (SMS) did not have enough staff to apply the tests to a large number of people notified as suspects, since the beginning of the pandemic. These people consulted the health service with mild symptoms, and were placed in domestic isolation for 14 days, but it was not possible to seal the diagnosis. In view of this, SMS asked for support from UFSM for the Mutirão to carry out rapid tests, held in Parque da Medianeira on July 11. It integrates the action, the analysis of the database, the identification, through telephone calls, of people who have already been tested and their notification, subsequent testing actions in basic health units and continuous processing of surveillance data. These stages extend during the pandemic. The elucidation of the list of suspects will make it possible to clarify the real magnitude of the pandemic in the city of Santa Maria by including mild cases of the disease in the official data. In addition, it will provide a service to people who still have doubts about their health situation.

Keywords: COVID-19, COVID-19 Test, Public Health.

1 INTRODUCTION

Covid-19 is an infectious respiratory disease caused by the New Coronavirus, Sars-Cov-2, discovered in December 2019, following an outbreak of pneumonia of unknown etiology in Hubei province, Wuhan municipality, China (SRIVASTANA, 2020). Sars-Cov-2 is one of seven human infecting viruses that can result in anything from an asymptomatic infection to severe acute respiratory syndrome, which often leads to death due to multiple organ failure (KUMAR, 2020).

The clinical presentation of Covid-19 includes non-specific signs and symptoms such as runny nose, cough, fever, fatigue, myalgia, dyspnea, headache, ageusia and anosmia. The initial picture of a flu-like syndrome can lead to misdiagnosis, with the patient getting worse and facilitating the transmission of the virus. The presence of comorbidities that can favor the development of these complications, increasing the severity of the disease, such as uncontrolled systemic arterial

hypertension, diabetes, coronary heart disease, hepatitis B, cerebrovascular diseases, chronic obstructive pulmonary disease, neoplasms, chronic kidney disease and immunodeficiency diseases. According to studies in China, the ages most affected are middle-aged or elderly (SHARMA, 2020).

The incubation period for Sars-Cov-2 is between 2 and 11 days (KUMAR, 2020). The virus is transmitted from person to person, through aerosols present in sneezing, speech, coughing or droplets in feces, in a highly contagious way, which would explain the rapid spread of the virus across the planet (YADAV, 2020). Another mode of transmission is through fomites (SHARMA, 2020).

Covid-19 positive individuals should remain in isolation for at least 14 days, monitoring any possible worsening of symptoms. Surveillance should contact the people with whom the infected individual has had contact, in order to trace cases (PADHI, 2020). The gold standard for diagnosis is the RT-PCR laboratory test, which detects viral RNA in the body and should be carried out within the first 7 days of symptoms. After this period, a rapid serological test is recommended, which identifies immunoglobulins in the body (IgM and IgG) through blood collection (PADHI, 2020).

In January 2020, the World Health Organization declared Covid-19 a Public Health Emergency of International Concern and, in March, a pandemic. Thousands of cases have spread to more than 196 countries. As of July 5, there were 11,125,245 confirmed cases and 528,204 deaths from Covid-19 worldwide, of which 1,539,081 cases and 63,174 deaths occurred in Brazil. Cases continue to increase worldwide (WHO, 2020).

The household-based study that has been evaluating virus infection in nine cities in RS (Epicovid-RS) showed that prevalence is low, but has been increasing. In the first three surveys, between mid-April and the end of May, it increased almost fivefold, from 0.048% to 0.22% (PR 4.6; 95%CI 1.01-21.03%) (HALLAL, 2020; SILVEIRA, 2020). In the last survey, on June 26 and 17, the prevalence increased to 0.47% (GOVERNO DO RIO GRANDE DO SUL, 2020). When the person drawn for the sample was positive, 35% of the residents of the household were also positive. (SILVEIRA, 2020) This study pointed to an underestimation of the official data in relation to the prevalence of infection found in the survey, which varied from 12 to 2 times, the lowest being in the last survey (GOVERNO DO RIO GRANDE DO SUL, 2020).

The occurrence of Covid-19 cases in Santa Maria follows the same upward trend as the state, as well as deaths. According to data from the municipality's Epidemiological Bulletin, as of July 4, 684 cases of Covid-19 have been reported, 17 deaths have occurred as a result and 302 cases have been cured (PREFEITURA DE SANTA MARIA, 2020).

Faced with the Covid-19 pandemic, several governments have enacted preventive measures aimed at containing the spread of the virus, such as isolation and social distancing, raising awareness among the population, hygiene at both the individual and collective levels, the use of masks, etc (SRIVASTAVA, 2020).

Mass testing of the population is another strategy for tackling the Covid-19 pandemic, as it provides a better understanding of the virus transmission situation in order to propose policies for action (WHO, 2020). However, the Brazilian Ministry of Health has invested very few resources and efforts to offer tests to the population. As a result, the few tests available in health services (both public and private) were only available for severe cases and for health professionals, especially in the first months of the pandemic.

In Santa Maria, starting in June, an initiative by the Labor Prosecutor's Office funded RT-PCR tests and the RS State Health Department funded rapid tests. However, the Santa Maria Municipal Health Department (SMS) didn't have enough staff to administer the tests to the large number of people who have been stuck since the beginning of the pandemic. In other words, these are people who have consulted a health service with mild symptoms, have been placed in home isolation for 14 days, but for whom it has not been possible to seal the diagnosis because there was no test available at the time. They were therefore notified as "suspected Covid-19 cases" by Epidemiological Surveillance (ES).

As a result, the SMS asked the Department of Collective Health and the UFSM Health Observatory for support in carrying out this action. It turned out that at the time, the VE had only four workers working on the Covid-19 pandemic, a 20-hour doctor, a coordinator, a nursing technician and a 40-hour biomedicine resident. This project was therefore designed in partnership with the SMS.

The rapid test used in this action is the WONDFO SARS-CoV-2 Antibody Test, which is approved by the Brazilian National Surveillance Agency (ANVISA). It is based on the principle of lateral flow immunoassay for the detection of IgG/IgM antibodies against SARS-CoV-2 in human whole blood, serum and plasma (WONDFO, 2020). Estimates from four validation studies of this test show sensitivity of 84.8% and specificity of 99.0%, with 95% confidence intervals of 81.4-87.8% and 97.8-99.7%, respectively (SILVEIRA, 2020).

The elucidation of the list of EV suspects made it possible to include mild cases of the disease in the city of Santa Maria in the official data. It has also provided clarification for people who until now have had doubts about their health situation. The University, through extension, has contributed to this moment of public calamity by making available the experience and work force of its teachers in organizing these public health events and in training and encouraging students in this dialogical interaction with society to carry out this action.

In this context, this article aims to describe the process of the Mutirão action developed by the University and VE; show the reduction in the list of cases notified by health services as suspected of Covid-19, in the municipality of Santa Maria, RS, and describe the profile of users who attended the Mutirão to perform the rapid tests.

2 METHODS

This section presents the steps used in the process at the Mutirão in Parque da Medianeira to test users and the preliminary analysis of the profile of the users who attended. The description is structured into five items that describe the work process of the VE and the University.

a) Analysis and Cleaning of the EV Database

Information on COVID-19 is sent to VE via e-SUS Notifica and Sivep-Gripe. The former contains outpatient information and the latter hospital data and deaths. VE then gathered these two databases and converted them into EXCEL software so that the DSC could check all the information. Several variables provided information, so a single variable was created indicating whether the individual had already been tested or had a test result. The other individuals would be eligible for the Mutirão collection.

b) Pilot study

Based on this list of names and phone numbers from VE, two medical students were trained to contact these people and invite them to take the rapid test at VE's COVID-19 Center. The aim was to test the time needed for the calls, acceptability and adherence to the event. The standardized telephone text was as follows: "Good morning! My name is x and I'm calling from the VE COVID Center. I'd like to speak to Mr. ... Your name is on the list of suspects with COVID-19. Have you been tested? IF YOU HAVE: Please can you send the results by Whatsapp or email? IF YOU HAVE NOT: I would like to invite you to take a rapid Coronavirus test. We'll take a drop of blood from the tip of your finger, using sterile materials. We'll do the test and the result will be available in fifteen minutes. It will show whether you have had contact with the virus. Could you come on day x, address x? Before I make your appointment, I need to ask you if you have any symptoms such as fever, sore throat, cough, difficulty breathing, smell or taste anything less, diarrhea, vomiting? Your test will be carried out at x hours. Can this be the time? Bring an identity document. Don't forget to wear a mask. IMPORTANT: The tests are only for people who have already been notified."

Therefore, the calls followed the script above, which explained the action and questioned the presence of symptoms. Scheduling took place by block of hours, with 3 exams per hour for each examiner. The calls were made to people with symptoms for more than 15 days, in reverse chronological order, in order to schedule 50 people for testing at VE's Covid-10 Center.

c) Totaling up the suspect lists and retracing the phone calls

The list of suspects was evaluated at two points in time, and the variables and values checked. The same procedure used in the pilot study was replicated at this point. This list was divided into ten parts so that each volunteer was responsible for their calls. A single spreadsheet was created in Google Drive (online) with names, telephone numbers and addresses so that the volunteers could note the users' appointments appropriately.

Based on the pilot study, the Health Department made ten telephone lines available for VE. Training was once again carried out by DSC teachers with students, Multiprofessional Residency Residents and Health Professionals. Telephone calls were made to each number at least three times, in alternating shifts. The work was carried out in the EV with adequate distancing. Telephone contact with suspected cases was also aimed at identifying people who had already been tested for Covid-19 in private services, such as RT-PCR or rapid tests. The person was asked to send the test result to an EV email or Whatsapp.

d) Training for the Mutirão in Parque da Medianeira

Based on the accumulated experience, training was provided for the main event of this action, which consisted of the Mutirão held in Medianeira Park. The team with experience in administering questionnaires and rapid tests received additional training on the afternoon of July 10, with the following program:

The Mutirão took place on Saturday, July 11, 2020, from 9 a.m. to 5 p.m., in the Festival Hall of the Basilica of Our Lady of Medianeira Park. The team arrived at 8 am to organize and test. The idea was that if anyone tested positive, they would be excused from the action.

The press reports were careful to emphasize that the action would only accept those notified by appointment, to avoid people inadvertently going to the park looking for tests. Family members of those who tested positive would be contacted by VE afterwards for tests.

Scheduling took place on Saturday, July 4, at the Covid Center. 10 telephone lines and 10 computers were made available, with a team of 10 schedulers. They received prior training the day before to standardize the approach, increasing the appeal and optimizing time. Scheduling continued throughout the week, with two phone lines available.

The Mutirão's capacity was planned to handle 480 exams. Scheduling was done by block of hours (3 people per hour per examiner), to avoid waiting times and organize the flow of people in the park. The people who had been booked went to the tables at the established times, the rapid test was administered and an interview was carried out while they waited for the results.

The team present on the day of the Mutirão included:

- **Coordination**: carried out by four people (two representatives from the SMS and two from the DSC

- **Reception**: located at the main gate to the park, with the task of checking the names of those on the list to allow them to enter the park. It was made up of five people: two from the SMS (checking the lists) and three people from the Traffic Department - the municipality's Urban Mobility Department (organizing the flow of cars and people).

- **Examiners**: 20 examiners/interviewers: Multiprofessional residents (3), EpicovidRS Research (17), FISMA (7), totaling 27 examiners (7 reserves).

- **Support**: the joint effort team had two types of support - Report Support and Guidance Support, with five people in each role. Laudo Support were senior health professionals who visually validated the test result. Before releasing the user, the examiner would call the Report Support to validate the result. The reports had guidance on the results and were signed and stamped by the VE. One Report Support attended to four examiners. The Guidance Support supported the examiners if the user needed more time to obtain information about the new Coronavirus and Covid-19 (symptoms, prevention, testing, etc.) and also helped with the reception and organization of people at the tables.

The infrastructure for prior action:

- **Flow of cars and people in the park**: Motorized users parked obliquely to the main entrance and entered unaccompanied heading for the ballroom. Exit at the back of the park.

- **Location for the tests**: Party Room with windows and balcony adequately sheltered users and examiners, maintaining adequate distance due to the pandemic and protection due to the cold weather.

- **Toilets**: Users, next to the Basilica. Staff, next to the ballroom.

Biosafety for users and staff was provided for with the following precautions: The room had space that allowed adequate distancing of 1.5m minimum between people, for examinations and circulation. The examiners wore Personal Protective Equipment (disposable gloves changed after each examination, disposable double surgical masks changed every 2 hours, face shields and disposable lab coats). The material used was sanitized with 70° alcohol after each exam (pen, clipboard, etc.). The tables were protected by kraft paper, changed every 2 hours or if contaminated. Liquid soap and a paper towel were available for washing hands, as well as 70° alcohol for sanitizing.

The user received the report with the results of the rapid test. A specific report was produced for the Mutirão, including a brief explanation of the meaning of the positive and negative test results in the one that already existed at the SMS. It was also pre-signed and stamped by a professional from the municipality's VE, in order to speed up the work at the Mutirão. Visual validation was carried out by a senior health professional (Laudo Support) before the result was released.

While waiting for the test result, information was collected using a questionnaire with data of interest to VE: presence of comorbidities related to Covid19, symptoms at the time of notification and adherence to social distancing. The project team processed and analyzed this information, registering a specific research project to analyze secondary data. In view of this, this support is indispensable, given the shortage of workers in the municipality's ES sector. This will ensure that research and extension are inseparable.

For those users who tested positive, a questionnaire was administered to investigate the people who lived in their household, for future investigation and follow-up by VE. If any of these people were

accompanying the user at the time of testing, they were invited to take the rapid test and answer the questionnaire. In the event of positive results, the case was referred to VE for further notification.

e) Profile of users who attended the joint effort

A standardized questionnaire was administered to all users during the group testing, with questions pertinent to COVID-19, as well as information on age, gender and schooling. These questions were double-typed and analyzed using Epi-info version 7.0. The analyses were descriptive.

3 RESULTS

Initially, from the initial July list of 4659 individuals with suspected COVID-19 symptoms, 58 had positive tests (26 rapid tests and 32 RT-PCR) and 1566 negative rapid tests, 1174 had already been tested but had no results entered and 5 had died from COVID-19. That left 1,856 eligible for the calls. So, at this point there has been a big reduction in the number of suspects.

The pilot study was then prepared. At this stage, the Covid Center provided a telephone line from Monday to Thursday, in the afternoon, so that two academics trained by DSC teachers could make contact with the suspects.

A total of 271 calls were made, of which 36 had already been tested, 16 still had symptoms - so couldn't attend, 17 were repeated names, 2 had moved city and 5 were refusals. In the end, it was possible to schedule 50 people to be tested on June 19, in the afternoon (1-5pm). Of these, 45 were tested by the five trained examiners - UFSM undergraduate and Multiprofessional Residency students - and five (11.1%) were positive for Sars-Cov2.

The assessment made after the pilot study was completed was that it was necessary to remove repeated names from the VE list, ask the municipality's laboratories to send negative reports to VE, increase VE's telephone lines and extend call times.

During the week before the Mutirão, starting on Saturday, July 4, at least three calls were made to each number on the notification register and a time was scheduled in a Google Drive spreadsheet. This technique allowed the ten schedulers to work simultaneously. On Saturday the 4th, and over the next week, approximately 1,500 calls were made to the Covid Center. Ten telephone lines and ten computers were made available, with a team of ten schedulers. They received training the day before to standardize their approach, increasing their appeal and optimizing their time. Scheduling continued throughout the week, with two phone lines available.

Of the users eligible (n= 1856) for the calls, approximately half of them could not be contacted because the phone number was not answered (370), the phone was set to voicemail (280), switched off (139), the number was incomplete/wrong or outside the coverage area (56) or there was no phone (6). In addition, 75 telephone numbers did not correspond to the name notified, 192 had already undergone

tests, 10 were living in other cities, 35 were refused, 69 were repeated names, 19 still had symptoms and 120 asked to call at another time.

People who had already been tested were encouraged to send their results to VE by email or Whatsapp, which was created specifically for this purpose as part of this project. These means of communication were checked daily by a Multiprofessional Resident linked to this project. The data was passed on to the EV for the following actions in the notifications: the tests that were in accordance with the standards of the Ministry of Health and the State Department of Health and had positive results were reclassified as confirmed cases and removed from the list of suspects. Cases with negative RT-PCR were excluded from the list of suspects. Cases with negative rapid tests will remain on the suspect list, due to the low sensitivity of the tests (around 85%).

Of the 192 who had already been tested, 90 sent in their results, of which 9 were positive RT-PCR tests, 57 were negative RT-PCR tests, 6 were positive rapid tests and 18 were negative rapid tests.

On the day of the Mutirão, 243 users showed up. Of these, 5 showed antibodies to Sars-Cov2.

Table 1. Profile of users who attended the Pilot and the Mutirão to reduce suspected cases. Santa Maria, RS, 2020.

FEATURES	**N**	**FREQUENCY**
SEX		
male	107	44,3%
female	136	56,0%
COLOR		
white	194	79,8%
other	49	20,2%
AGE GROUP		
0-19 years	31	12,8%
20-59 years	181	74,5%
60 years or older	31	12,8%
CIVIL STATUS		
married	145	60,4%
others	95	39,6%
SCHOOLING		
up to incomplete secondary education	77	32,0%
up to incomplete higher education	105	43,6%
up to post-graduation	59	24,5%
WORKS IN HEALTH		
yes	35	14,4%
SMOKING		
yes	28	11,5%

Table 2. Reported morbidity of users who attended the Pilot and the Mutirão to reduce suspected cases. Santa Maria, RS, 2020.

FEATURE	**N**	**FREQUENCY**
OBESITY (BMI > 30)		
yes	56	25,7%
DEPRESSION		
yes	60	24,7%
LUNG DISEASE		
yes	57	23,6%
HIGH PRESSURE		
yes	55	22,8%
HIGH CHOLESTEROL		

yes	47	19,5%
HIGH BLOOD SUGAR		
yes	26	10,7%
HEART DISEASE		
yes	20	8,3%
KIDNEY DISEASE		
yes	9	3,7%
IMMUNE DISEASES		
yes	6	3,0%
CANCER		
yes	7	2,9%
DERRAME		
yes	4	1,7%

Table 1 shows the distribution of users who were present for Covid-19 testing. More than half were women. Around 80% were aged between 20 and 59, most of them had white skin and were married. Among the users, 43% had up to incomplete higher education. At the time of testing, 14% worked in the health sector. Smoking was present in 11%, as was diabetes. High blood pressure was found in a fifth of cases, as was high cholesterol. Around 8% had heart disease. In addition, around 4% had some kind of kidney disease and 23% had lung disease. Stroke affected 1.7% of cases and a history of cancer 3%, as did the presence of some kind of immune disease. A quarter of users had experienced depression, obesity and other health problems.

- User profileIn the dNTa

4 DISCUSSIONS

Data collection at all stages required careful processing of the different forms, from scheduling the pilot event, identifying tests that had already been carried out, checking and cleaning the list of suspects, typing up interviews, and notifying new cases based on tests sent or identified during the Mutirão.

It was necessary to check the names on different lists and type in the new information to update the VE data. As already mentioned, the municipality's VE staff is scarce, and given the overload of the pandemic, it needs reinforcements, which this project complements with scholarship holders and volunteers, on some scale.

We also identified the importance of training on how to properly fill in the telephone number on notifications, as approximately half of the sample could not be contacted because the number was incorrect.

Throughout the process, it was possible to reduce the number of cases reported as suspicious for EV.

The plan is to schedule other actions to carry out rapid tests at basic health units (UBS) where there is a higher concentration of suspected cases, or at the Covid Reference Center.

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