Demand for health services during the Covid-19 pandemic: population-based studies

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ABSTRACT

Objective: To evaluate the demand for health services during the Covid-19 pandemic and its associated factors.

Methods: A population-based cross-sectional study was conducted in two cities in southern Brazil: Criciúma, in the state of Santa Catarina, and Rio Grande, in the state of Rio Grande do Sul. The study included individuals aged 18 years and older residing in urban areas of these municipalities. Participants self-reported their health service utilization and the type of service sought. Sociodemographic, behavioral, and health-related variables were examined as exposures. Poisson regression was used to analyze the adjusted associations between service demand and exposure variables. Results were presented as prevalence ratios (PR) with 95% confidence intervals (95% CI).

Results: A total of 2,167 individuals were analyzed. Approximately 25% of participants reported experiencing at least one Covid-19-related symptom. Among these, 51.3% sought health services, with Basic Health Units being the most frequently sought (46.7%). Health service demand was higher among individuals aged 50 to 59 years (PR=1.60; 95% CI 1.18, 2.17), those with higher education (PR=1.52; 95% CI 1.13, 2.03), those who engaged in physical activity (PR=1.29; 95% CI 1.07, 1.59), and those who had contact with someone who tested positive for Covid-19 (PR=1.76; 95% CI 1.40, 2.21).

Conclusion: The results highlight two distinct population groups: those with greater exposure to Covid-19 and those more attentive to health care. Additionally, the Basic Health Unit was the most sought-after service, underscoring the importance of Primary Care and the Unified Health System in addressing the pandemic in Brazil.

Keywords: Public health, Coronavirus, Health Promotion, physical exercise, Epidemiology.

INTRODUCTION

At the end of 2019, residents of Wuhan, China, began exhibiting flu-like symptoms that rapidly progressed to severe acute respiratory syndrome. The virus responsible for this new infection, later named Covid-19, was identified as a novel coronavirus (SARS-CoV-2)[12]. In Brazil, the first case of Covid-19 was reported in February 2020, and within a year, the country had recorded over 250,000 deaths, making it one of the nations with the highest death toll during the pandemic[3–5].

In pre-pandemic Brazil, the Unified Health System (SUS) already guaranteed universal access and comprehensive

health care for the entire population[6], with Primary Health Care (PHC) responsible for the coordination of care and individual and collective health demands[1]. In the context of the Covid-19 pandemic, the leadership of the Brazilian Public Health System in the care of Covid-19 victims, especially PHC, demonstrated its relevance for maintaining the health of the population[6,8]. This system proved to be overloaded due to the difficulty presented by private health plans in providing coverage to health services, not guaranteeing access to their clients, who began to seek more SUS[9,10,]

In this scenario, the population that most sought health services due to symptoms and/or diagnosis of Covid-19 was people in greater social vulnerability, older (especially those aged 40 years or more) and with pre-existing chronic non-communicable conditions (NCDs)[4,5,11]. These individuals used the assistance provided by the SUS during the pandemic, above all, to treat symptoms related to Covid-19, from PHC to other levels of care[12–14].

Understanding the factors associated with the search for health services is essential for better SUS planning, considering the demands in times of health crisis such as the Covid-19 pandemic, and promoting health equitably[8]. Therefore, this study aimed to evaluate the demand for health services during the Covid-19 pandemic and its associated factors in adults and the older people, using data from two population-based studies conducted in southern Brazil.

METHODS

Study setting and context

It is a cross-sectional population-based study called "Mental Covid: impact of Covid-19 on the mental health of the population" performed in two cities in southern Brazil: Criciúma (State of Santa Catarina) and Rio Grande (State of Rio Grande do Sul). The city of Criciúma has approximately 217,311 inhabitants, Human Development Index (HDI) of 0.788, and population density around 815.87 inhabitants per km^2 [15]. The city of Rio Grande has 21,965 inhabitants, HDI of 0.744 and population density of 72.79 inhabitants per km^2 [15]. The study was conducted during the pandemic Covid-19, between October 2020 and January 2021.

Participants

The study included people with 18 years or older residents in the urban area of the cities of Criciúma-SC and Rio Grande-RS. It excluded people who were physically or cognitively unable to answer the questionnaire from the survey.

Sampling and sample size calculation

The sampling process took place in two stages, according to the Brazilian demographic Census of 2010[16]. Initially, the primary units (census tracts) were randomly selected, with probability proportional to sector size. Subsequently, the secondary units (households) were drawn from the previously selected census tracts. In

Criciúma, there are 307 census tracts, of which 60 were selected, resulting in 15,765 domiciles. Of these households, 607 were systematically included in this research. In Rio Grande, there are 327 census tracts, of which 90 were selected, resulting in the systematic selection of 900 households for this study. All persons aged 18 years or older living in the selected households were invited to participate in the study.

Collection of data

Previously trained interviewers conducted the data collection face-to-face using personal protective equipment to prevent SARS-CoV-2 contamination. They applied a single, pre-coded, and standardized questionnaire to those who consented to participate in the study, containing information on demand for health services, and sociodemographic, behavioral and health variables. They used the RedCap® software through tablets for the application of the questionnaire. Each interview lasted, on average, 30 minutes.

Variables studied

The outcome variable "search for health services during the Covid-19 pandemic" was measured through the following question: "Did you seek care at any health service due to symptoms related to Covid-19"? The answer options were: "no" and "yes." Subsequently, the type of health service sought by the participants was evaluated through the question: "What health service was sought"? The health service options were "basic health unit (BHU)/health care unit," "private medical office or medical insurance," "emergency care unit (ECU)/24-hour care unit/emergency room,"

"hospital," "tele-screening," and "Covid-19 screening center".

As exposure variables, the analysis included sociodemographic variables, such as: gender (male, female), age (collected in complete years and categorized in: 18-29, 30-39, 40-49, 50-59, ≥60), skin color (white, black, brown), education (collected in series and grade and categorized into Elementary School, High School, Higher Education), and wealth index (categorized in tertiles). The latter was evaluated through the analysis of main components according to the information on number of parts/rooms in the home used for sleeping, number of bathrooms, freezer, dryer, computer or notebook, internet, air conditioning, number of cars.

The following health-related variables were also analyzed: health insurance (no, yes), smoking (no, yes), alcohol consumption (no, yes), physical activity (<150, ≥150 minutes per week), diet quality (categorized in tertiles)[17,18], self-reported systemic arterial hypertension (no, yes), self-reported diabetes mellitus (no, yes), obesity (no, yes), self-reported cardiovascular disease (no, yes), and self-reported depression (no, yes). The study assessed physical activity using the long version of the International Physical Activity questionnaire considering leisure and commuting activities (IPAQ)[19], and used the classification recommended by the World Health Organization[20]. Researchers used the diet indicator proposed by Francisco et al., 2019[18] to assess the quality of the diet. This indicator considers the weekly frequency of consumption of healthy foods (fruits, vegetables, milk, and legumes) and unhealthy foods (sweets, soft drinks or industrialized juice, and red meat). Depending on the food and the weekly frequency of consumption, the answers received scores from zero to

four points. Regarding healthy foods, individuals who made daily consumption received the lowest score, and those who never or almost never consumed, received the highest. Conversely, the lower frequency of consumption of unhealthy foods corresponded to the lower score and the higher frequency of consumption, the higher score. The total score consisted of the sum of the food items, ranging from 0 (best food quality) to 28 points (worst food quality). The total score was categorized in tertiles of the distribution[18]. Obesity was assessed through self-reported weight and height and, subsequently, calculation of body mass index (BMI). People with BMI ≥30 Kg/m were classified as obese[2 21].

Finally, the study analyzed the following behavioral variables related to the pandemic: fear associated with Covid-19 (no, yes) and contact with someone infected (no, yes). Fear related to Covid-19 was assessed through the Fear of Covid-19 scale, which consists of a screening tool developed with seven items using a five-point Likert scale (ranging from 1 = "strongly disagree," 3 = "neither agree nor disagree," and 5 = "strongly agree"). The cumulative score ranged from 7 to 35 (the higher the score, the greater the participants fear of Covid-19). This score was divided into quintiles and individuals in the highest quintile were classified as having the greatest fear of Covid-19[22,23].

Statistical analysis

The study performed the descriptive analysis of all variables studied by presenting the absolute (n) and relative (%) frequencies. Crude analyses of the association between demand for health services and sociodemographic, behavioral and health variables were performed using the chi-square test, using a significance level of 5%.

It also performed adjusted analyses to verify whether the significant associations were independent of possible confounders. For this, Poisson regression with robust variance was used. Researchers developed a hierarchical model to define the potential confounders and selected the variables by the backward method, considering each hierarchical level. Those variables with a significance level of 20% (p-value <0.20) were considered possible confounding factors and remained in the last analysis model. The results were presented as prevalence ratio (PR) and their respective 95% confidence intervals (95% CI).

STATA version 17.0 performed all the analyses.

Ethical aspects

The National Research Ethics Committee of the Federal University of Rio Grande evaluated and approved the project in July 2020 under Opinion number 4,162,424. All participants provided verbal consent at the time of the interview.

RESULTS

The study analyzed a total of 2,167 people (response rate of 75%). Most of them were female (59.7%), white (84.0%) and 60 years or older (31.2%) (data not shown in Table).

About a quarter of people reported having presented at least one symptom related to Covid-19 (23.0%). Among them, 51.3% sought the health service due to this symptom(s). In the city of Criciúma, 30.8% of people reported having some symptom of Covid-19, and of these, 59.3% sought the health service. In the city of Rio Grande, this prevalence was 17.9% and 42.3%, respectively (Figure 1).
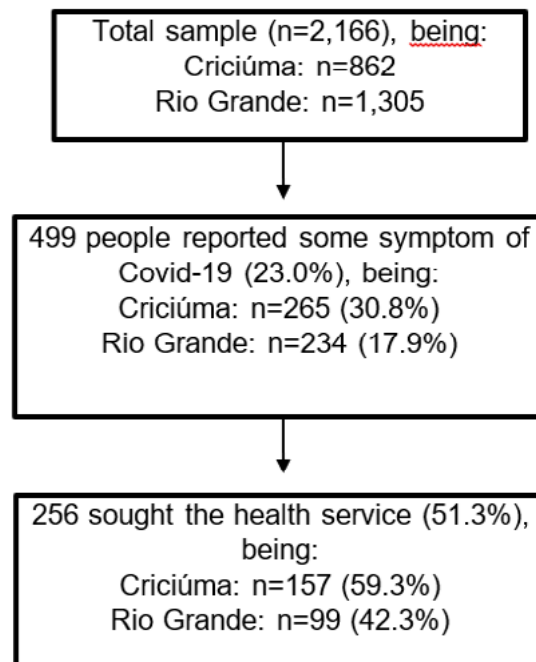
Figure 1. Flowchart of study participants.

Table 1 presents the crude and adjusted analyses of the association between demand for health services and independent variables studied in both municipalities. It observed that, after adjusted analysis, the demand for health services was higher in individuals between 50 and 59 years, with higher education, sufficient physical activity and who had contact with someone positive for Covid-19. The other variables were not associated with the demand for health services.

Table 1. Crude and adjusted analysis of the association between demand for health services during the pandemic and the sociodemographic, behavioral and health variables studied. Criciúma-SC and Rio Grande-RS, 2021. (n=256)
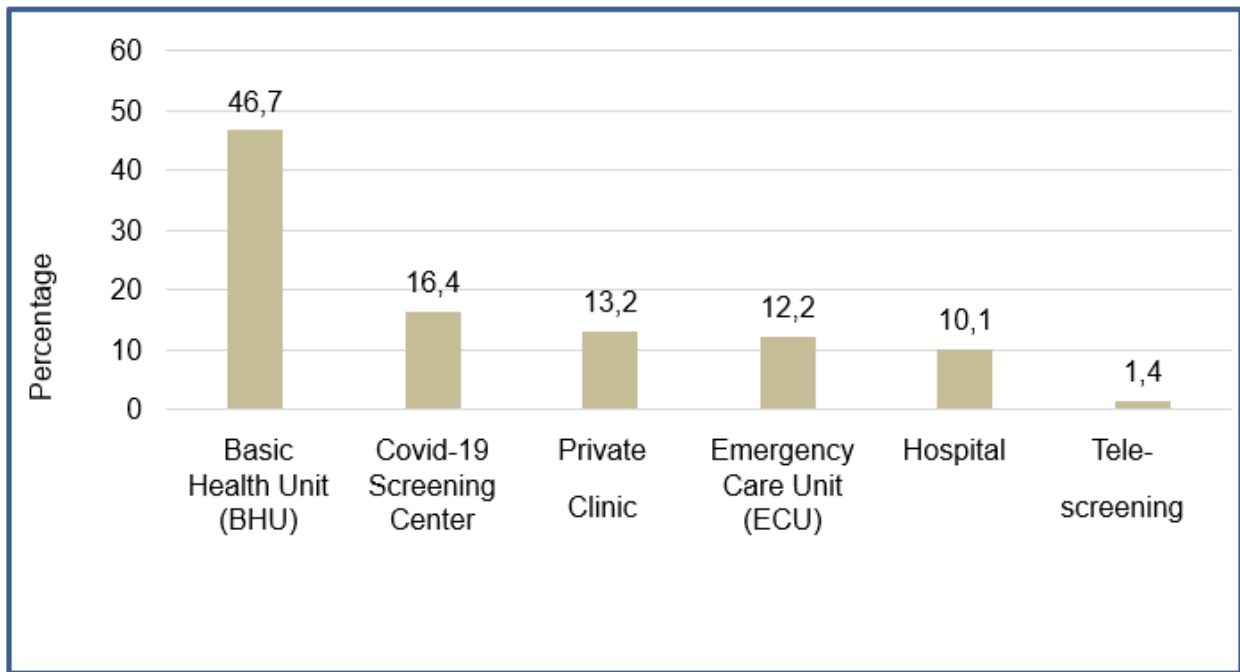
| Variables | Demand for health services | | |
| | Raw analysis* | | Adjusted analysis** |
	N (%)	P-value	PR (95% CI)
Sex		0.173	
Male	47.5		1.00
Female	53.9		1.14 (0.97;1.33)
Age (years)		0.011	
18-29	49.5		1.00

30-39	56.2		1.28 (0.90;1.83)
40-49	61.4		1.48 (1.09;2.00)
50-59	53.3		1.60 (1.18;2.17)
60 or more	38.5		1.38 (1.02;1.87)
Skin color		0.538	
White	51.9		1.00
Black	42.5		0.81 (0.55;1.17)
Brown	51.4		0.99 (0.70;1.40)
Schooling		<0.001†	
Primary education	41.4		1.00
High school	51.8		1.22 (0.90;1.67)
Higher education	66.4		1.52 (1.13;2.03)
Wealth Index		0.002†	
1st tertile (poorest)	41.1		1.00
2nd tertile	50.0		1.08 (0.84;1.38)
3rd tertile (richest)	60.8		1.22 (0.95;1.57)
Health insurance		0.082	
No	48.5		1.00
Yes	57.3		0.99 (0.81;1.23)
Smoking		0.599	
No	50.8		1.00
Yes	54.5		1.25 (0.96;1.62)
Alcohol use		0.808	
No	51.0		1.00
Yes	53.1		0.95 (0.71;1.25)
Practice of physical activity		0.001	
No	47.8		1.00
Yes	67.4		1.29 (1.07;1.56)
Diet quality		0.265	
1st tertile (worst)	55.7		1.00
2nd tertile	47.1		0.94 (0.74;1.19)

3rd tertile (best)	49.7		1.05 (0.86;1.28)
SAH		0.182	
No	53.4		1.00
Yes	46.9		0.94 (0.72;1.24)
Diabetes mellitus		0.696	
No	51.9		1.00
Yes	48.5		1.09 (0.80;1.48)
Obesity		0.351	
No	49.7		1.00
Yes	54.8		1.16 (0.98;1.37)
Cardiovascular disease		0.114	
No	52.5		1.00
Yes	40.7		0.89 (0.63;1.25)
Depression		0.388	
No	50.5		1.00
Yep	56.4		1.17 (0.92;1.50)
Fear of Covid-19		0.063	
No	52.9		1.00
Yes	43.2		0.94 (0.73;1.21)
Contact with someone positive for Covid-19		<0.001	
No	38.0		1.00
Yes	67.6		1.76 (1.40;2.21)

SAH: systemic arterial hypertension. PR: Poisson regression. CI: confidence interval. Pearson's Chi-square test. ** Poisson regression adjusted for the variables in this table, respecting the hierarchical levels of determination. †Linear trend.

Figure 2 shows which health services were sought during the Covid-19 pandemic. About half of the people sought out BHU (46.7%). ECU was sought by 12.2% of people, and 10.1% reported seeking hospitals. In addition, the vast minority sought the tele-screening service (1.4%).

Figure 2. Health services sought during the pandemic. (n=256).

DISCUSSION

This study, which aimed to evaluate the demand for health services during the Covid-19 pandemic and its associated factors, showed that about half of the people who reported any symptoms of Covid-19 sought the health service, with the most sought service being the BHU. In addition, people with higher education, between 50 and 59 years old, with sufficient physical activity and who had contact with someone infected by Covid-19, were the ones who most sought health services.

The ELSI-COVID-19 survey[24], conducted with Brazilian adults aged 50 years or older, found that 10.4% of the evaluated population presented some symptom related to Covid-19, with 33.6% seeking care due to it. When specifically evaluated in the southern region, 8.5% presented symptoms, with 11.4% seeking

health care due to this situation. The North region had the highest frequency of Covid-19 symptoms and demand for care[24]. On the other hand, a higher prevalence of demand was found in a study conducted in the state of Espírito Santo (82.6%). However, the study considered people of all ages, which may have overestimated the prevalence compared to this study, in addition to evaluating only the demand for care in BHU[25].

In the scenarios contemplated in this study, the health services that participants most sought in case of contact with someone positive for SARS-CoV-2 was the BHU. In PHC, this health service is one of the main facilities responsible for providing greater ease of access for the population. During the pandemic, the operation of BHU occurred differently throughout Brazil: some locations always remained open, others adapted their schedules, and in others, the services were interrupted[26].

The lack of national coordination for the pandemic has resulted in a situation of heterogeneity in the BHU's work process, which has led to difficulties for the Family Health teams, both in the work process and even in guaranteeing minimum conditions for professional practice, such as granting personal protective equipment[27]. Even so, PHC continued to assist the health of the Brazilian population during the Covid-19 pandemic, playing an essential role in the care of symptomatic cases of the disease[6,8].

Regarding the variables associated with the demand for health services, schooling is associated with better health conditions[28]. In the present study, findings demonstrate that higher education is related to higher demand for health services. It may be related to the better knowledge and health concerns of people with more schooling[28].

In a multilevel study with adolescents, contextual variables did not influence the demand for health services during the pandemic. However, it observed that being female, having a mother with a level of education greater than or equal to nine years of study, and being physically active were associated with a greater demand for health services or professionals[29]. In another study, adolescents of white race/color who studied in private schools and had mothers with a higher level of education showed a high association with demand for health services or professionals. Considering such features as proxy of income, the effects are like those presented by study with adults[30].

Macinko et al.'s study[24] could have proven this assumption, in which older adults with nine years of schooling had a higher prevalence of seeking care due to Covid-19 symptoms (55.4%). However, when the adjusted analysis was performed, this association was not maintained (PR=1.10; 95% CI: 0.70-1.74)[24], most likely due to the absence of a higher level of education in the sample. An analogous situation also occurred in the study by Cardoso et al.[25]. This is a significant differentiation of this research that evaluated people with primary, secondary, and higher education, with the latter representing more than nine years of study.

With regard to age, studies found no association with demand for health services due to Covid-19 symptoms after adjusted analyzes[24,25]. However, similar to the results presented here, an investigation from the State of Minas Gerais evaluating the factors associated with a Covid-19 telehealth service observed that the older the age, the greater the use of this health service by people positive for SARS-CoV-2 infection. In the case of people with a negative diagnostic test for the disease, those aged between 20 and 59 years were the ones who most sought the telehealth service[31].

The increase in the search for health services for older people symptomatic for Covid-19 may be due to the higher morbidity and mortality numbers of the disease in this population group. Such factor can significantly contribute to the need to use health services. In addition, uncertainty about their future - a situation arising from this susceptibility - may also be responsible for the greater access of these people to health services[32].

On the other hand, the age range between 40 and 59 years is a period in which people tend to seek health services more as a result of a series of factors, such as physiological and emotional changes,

since at this age there is an increase in the prevalence of chronic conditions, such as diabetes, hypertension, and joint problems[33]. In addition, the perception of health care can also contribute to this increase in demand, as people start to worry about some diseases, increase awareness about the importance of prevention of diseases and that some tests are essential to identify problems[34], as well as a greater concern for healthy aging and maintaining quality of life[35].

Concerning income, the richest people had the most access to health services. It converges with the analysis of the living conditions of the Brazilian population[36], which shows that the Southern Region of Brazil has the lowest Gini index (0.462) and Palm (2.03 – 3.12). However, this is not a national reality. Guibu et al.[37] (2017), when evaluating the characteristics of 8,676 users of PHC services in Brazil, found that more than half of the respondents were classified in Class C.

Another relevant result was the higher prevalence of the demand for health services during the Covid-19 pandemic among physical activity practitioners. Unlike this result, a study prior to the Covid-19 pandemic evaluating the influence of a physical exercise program on the use of health services in PHC found that after starting the program, there was an improvement in the participants' perception of health and a decrease in the use of health services, the number of visits to the PHC, the number of blood pressure measurements, the lack of control of blood pressure and blood glucose[38].

In Brazil, there was a considerable reduction in the practice of sufficient physical activity during the Covid-19 pandemic[13]. A study on health behaviors and the adoption of protective measures against Covid-19 evidenced that people with adequate physical activity practice were less likely not to have left home the day before and to wear a mask in public[39]. Despite the numerous benefits of sufficient physical activity, these results demonstrate a new facet of this behavior during the pandemic.

People who regularly practice physical activity tend to seek health services more often because they are more aware of the importance of self-care and health promotion[40]. Considering the results of the study by Peixoto et al.[39], it is possible to assume that people with sufficient practice of physical activity sought health services more because they were more exposed to Covid-19 infection due to the behaviors adopted during physical activity.

Finally, the demand for health services was also higher in people who had contact with confirmed cases of Covid-19. According to this result, a study conducted in Ethiopia observed that people who had had contact with confirmed cases of the disease were more likely to adopt behaviors related to health seeking, including seeking care in health services[41].

In Brazil, this search for care due to having had contact with someone who was positive occurred mainly in the BHUs, and the development of signs or symptoms suggestive of Covid-19 during the monitoring period was considered as suspected cases of Covid-19. From this, following the flow of the health system, the affected person is guided to seek a closer health service for clinical evaluation and testing[42].

Some limitations of the study need to be highlighted. First, it is a cross-sectional study, in which it is not possible to establish causality of the associations. In addition, variables that were self-reported should be analyzed with caution since they may be subject to measurement bias. As a strength, it is relevant to highlight the complex sampling process conducted in two stages as well as the representativeness of the sample studied from two municipalities in southern Brazil. In addition, the interview was conducted in person, in the participants' homes, since most of the research conducted during the Covid-19 pandemic were online.

CONCLUSION

The study concluded that the demand for health services among symptomatic people was low. In addition, people with higher education, between 50 and 59 years old, with sufficient physical activity, and who had contact with someone infected with Covid-19 were the ones who most sought health services during the pandemic. It is possible to assume that these results identify two major strata of the population during the Covid-19 pandemic: those who were more frequently exposed to SARS-CoV-2 infection and those who were more attentive and willing to seek health care for Covid-19.

In addition, the fact that the BHU was the health service most frequently sought by symptomatic people evidences the importance and representativeness that PHC and SUS had in coping with the Covid-19 pandemic. The public health service has significant strategies and preparation for facing emergency situations, such as Covid-19, becoming crucial for maintaining the health of the Brazilian population.

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