

ORIGINAL ARTICLE

Covid-19 in primary health care users in a municipality in the Southeastern Mato Grosso State: a cross-sectional study

Covid-19 em usuários da atenção primária à saúde de um município do sudeste de Mato Grosso: um estudo transversal

Covid-19 en usuarios de la atención primaria de salud en un municipio del sureste de Mato Grosso: un estudio transversal

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ABSTRACT

Background and Objectives: Covid-19 is a global health issue with high morbidity and mortality rates, as well as impact on health systems. The study aimed to analyze the profile and factors associated with self-report of Covid-19 in the context of Primary Health Care. **Methods:** This is a cross-sectional, observational study conducted with users of the Family Health Strategy in the city of Rondonópolis (Mato Grosso State). Data were collected at health units using a semi-structured questionnaire. **Results:** Among 400 survey participants, 77 (19.25%) reported a Covid-19 diagnosis. Variables associated with self-report were higher income, having health insurance, and being in the labor market. The main clinical symptoms were myalgia, fever, and headache. Mild cases of the disease predominated and sentinel units were the main health service used. **Conclusion:** The data point to the impact of social variables on the diagnosis of Covid-19 and reveal the importance of services offered by the Brazilian Unified Health System (SUS) during the pandemic.

Keywords: Covid-19. Primary Health Care. Epidemiology. Associated factors.

RESUMO

Justificativa e Objetivos: A Covid-19 representa um problema de saúde mundial com elevados índices de morbimortalidade e impacto nos sistemas de saúde. O objetivo desta pesquisa foi analisar o perfil e os fatores associados ao autorrelato de Covid-19 no âmbito da Atenção Primária à Saúde. **Métodos:** Trata-se de um estudo transversal, observacional, realizado com usuários da Estratégia Saúde da Família (ESF) do Município de Rondonópolis-MT. Os dados foram coletados nas unidades de saúde por meio de um questionário semiestruturado. **Resultados:** Dos 400 participantes da pesquisa, 77 (19,25%) relataram diagnóstico de Covid-19. As variáveis associadas ao autorrelato da doença foram: maior renda, ter plano de saúde e estar inserido no mercado de trabalho. Os principais sintomas clínicos foram: mialgia, febre e

cefaleia. Predominaram os casos leves da doença, e a unidade sentinela foi o principal serviço de saúde utilizado. **Conclusão:** Os dados apontam para o impacto das variáveis sociais no diagnóstico da Covid-19 e revelam a importância dos serviços ofertados pelo Sistema Único de Saúde (SUS) no contexto da pandemia.

Descritores: Covid-19. Atenção Primária à Saúde. Epidemiologia. Fatores associados.

RESUMEN

Justificación y Objetivos: El Covid-19 representa un problema de salud mundial con altas tasas de morbimortalidad e impacto en los sistemas de salud. El objetivo de este estudio fue analizar el perfil y los factores asociados con el autoinforme del Covid-19 en el contexto de la atención primaria de salud. **Métodos:** Se trata de un estudio transversal, observacional, realizado con usuarios de la Estrategia Salud de la Familia en el municipio de Rondonópolis (Mato Grosso, Brasil). Los datos se recolectaron en las unidades de salud mediante un cuestionario semiestructurado. **Resultados:** Entre los 400 participantes de la encuesta, 77 (19,25%) informaron que tuvieron diagnóstico del Covid-19. Las variables asociadas con el autoinforme de la enfermedad fueron mayores ingresos, tener seguro de salud y estar en el mercado laboral. Los principales síntomas clínicos fueron mialgias, fiebre y cefalea. Predominaron los casos leves de la enfermedad, y la unidad centinela fue el principal servicio de salud utilizado. **Conclusión:** Los datos apuntan al impacto de las variables sociales en el diagnóstico del Covid-19 y revelan la importancia de los servicios ofrecidos por el Sistema Único de Salud (SUS) en el contexto de la pandemia.

Palabras clave: Covid-19. Atención Primaria de Salud. Epidemiología. Factores asociados.

INTRODUCTION

The disease caused by the new coronavirus, known as Covid-19, was first reported in Brazil in February 2020. In September of that year, the second phase of the pandemic began. However, the highest peak in daily cases and deaths was observed during the third phase, which started in February 2021. From July 2021 onward, with the expansion of vaccination efforts, a decline in the number of infections and deaths was noted, marking the fourth phase, which lasted until November 2021. At that point, infection rates rose once again, characterizing the fifth phase of the pandemic.¹

The municipality of Rondonópolis, located southeast of Mato Grosso State, presented a distribution pattern of Covid-19 cases throughout the pandemic similar to the national epidemiological trend.² For better disease control, measures such as social distancing, mandatory use of masks, and vaccination—initiated in January 2021—were implemented.^{3,4}

Covid-19 has several clinical characteristics, ranging from asymptomatic cases to mild, moderate, or severe illness. The most common symptoms are fever, cough, dyspnea, myalgia, and fatigue.^{5,6} According to the literature, factors associated with coronavirus infection include advanced age, male sex, Black skin-color, working in healthcare, pre-existing comorbidities, etc.⁷⁻⁹

Notably, the dynamics of this disease vary across different regions of Brazil, depending on intra-urban factors such as infrastructure, population density, mobility patterns, and adherence to prevention measures. Urban demographic and socioeconomic conditions can therefore increase the vulnerability of cities and regions to pandemics.¹⁰ Additionally, factors such as the structure, practices, and routines of local health services must also be considered.¹¹ Primary Health Care services (PHC) played a decisive role during the pandemic by leveraging territorial knowledge, ensuring access, fostering bonds between users and healthcare teams, providing comprehensive care, monitoring vulnerable families, and following up on suspected and mild cases. To ensure quality care at this level, data-informed planning, service reorganization, reallocation of financial resources, and the adoption of specific strategies to confront the pandemic are essential.¹²

Given Brazil's large dimensions and highly diverse local contexts, the country faced challenging pandemic response efforts. Thus, it is important to know and evaluate local epidemiological data to support decision-making.¹¹ Understanding the dynamics of the Covid-19 pandemic within PHC is crucial to develop measures and policies aimed at reducing health impacts during emergency situations. In this context, this study aimed to analyze the profile and factors associated with self-reported Covid-19 diagnosis within PHC.

METHODS

This is a cross-sectional study conducted with users of the Family Health Strategy (FHS) in the municipality of Rondonópolis, Mato Grosso, from January to September 2021. According to the last census by the Brazilian Institute of Geography and Statistics (IBGE), Rondonópolis—located southeast of Mato Grosso State—has approximately 138,326 residents aged 18 years or older, representing 70.76% of the total population.¹³ PHC covers 72.75% of its territory.

The sample size was calculated based on the number of residents aged 18 or older in the municipality, as reported by IBGE. The assumptions used for calculation included a 95% confidence level, a 5% margin of error, and an expected proportion of 0.50. The margin of error refers to the maximum expected deviation of the study results based on the selected sample. The confidence interval represents the probability that the results would be similar if the study were conducted with another group of individuals sharing the same profile, within the same margin of error. This resulted in a sample of 384 users; however, to account for potential losses, 400 individuals were included in the study. A convenience sampling method was used, and participants were selected among users who were present at basic health units at the time of

data collection. Although convenience sampling may introduce bias, it was chosen because it is an accessible method for researchers to contact FHS users. Given that data collection took place during the pandemic, visiting participants at home after random selection could have caused discomfort and led to a high number of refusals.

All FHS units located in the urban area of the municipality were included, except those that had been converted into Sentinel Health Units or were closed to the public due to renovations, totaling 40 FHS. During the pandemic, many health units in Rondonópolis were converted into Sentinel Health Units, which aimed to diagnose cases of flu-like syndromes and, therefore, were not limited to serving only the population of the FHS assigned area. Convenience sampling was used, with 10 users selected from each FHS unit, resulting in 400 participants.

Users aged 18 or older were included. Individuals with cognitive impairments or with health conditions that prevented data collection were excluded. Users who met the inclusion criteria were invited to participate in the study and were informed about its objectives; those who agreed to participate signed an informed consent form.

Data were collected from January to September 2021 in a private setting within the basic health units. To ensure standardization in data collection, researchers were trained on how to approach participants and record information on the form. A pilot study was conducted to adjust the data collection instrument with individuals who were not part of the sample. A semi-structured questionnaire was elaborated using Google Forms, consisting of three sections including question on sociodemographic, clinical, and health service use. The responses were entered directly by the interviewers into the digital platform, and the data were automatically exported into a Microsoft Excel spreadsheet.

To determine factors associated with self-reported Covid-19 diagnosis, the dependent variable in the study was the self-report of a positive laboratory test result for SARS-CoV-2, and the response was dichotomized as “yes” and “no.” To assess this, participants were asked: *Have you had a laboratory test that confirmed a Covid-19 diagnosis?*

The following variables were considered as independent variables:

- a) Demographic characteristics: sex, age in years, self-reported skin-color, and marital status.
- b) Socioeconomic characteristics: schooling in years, household income, number of people living in the household, employment status, whether the individual worked in an essential activity during the pandemic, number of household members who left home due to work, and private health insurance plan.

c) Clinical characteristics: presence of comorbidities and number of comorbidities.

Bivariate logistic regression models were constructed, meaning that each model included only one independent variable in relation to the outcome variable (dependent variable). Adjusted odds ratios (ORs) with their respective confidence intervals (95%CI) were estimated for each bivariate logistic model. The likelihood ratio test was used to verify the significance of the estimated model. Moreover, the Wald test was applied to determine the significance of the model coefficients adjusted to the data. To evaluate the adequacy of the proposed statistical model in describing the observations, the normality and independence of the errors were verified. These procedures aimed to ensure the theoretical assumptions necessary for conducting statistical analyses using univariate techniques. All analyses were performed using the R© programming language, version 3.4.3, and a 5% significance level was set.

The study was approved by the Research Ethics Committee of the Júlio Muller University Hospital, Federal University of Mato Grosso CAEE 39427420.1.0000.5541, approval No. 4,418,798, on November 24, 2020. All ethical principles regarding research involving humans were respected, in accordance with Resolution No. 466/2012.

RESULTS

Of the study participants, 77 reported a laboratory diagnosis of Covid-19, corresponding to 19.25% of the studied population. The average age of users with a history of SARS-Cov-2 infection was 41.78 years. Among participants who self-reported Covid-19 diagnosis, most were male; aged 18–39 years; Mixed-race individuals; living with a partner; five to eight years of schooling; household income of two or more minimum wages, and up to three members in the household. A higher probability of self-reported laboratory Covid-19 diagnosis was also identified among individuals engaged in formal or informal work; those who worked in essential services during the pandemic; individuals living in households where two or more people had to leave home for work; and those with private health insurance (Table 1).

Regarding clinical characteristics, a higher prevalence of self-reported Covid-19 was observed in individuals with comorbidities and among those with two or more comorbidities. A statistically significant difference was found for the variables “engaging in formal or informal work” ($p=0.02$) and “having a private health insurance” ($p<0.01$) (Table 1).

Table 1. Profile of the study participants, according to self-reported laboratory Covid-19 diagnosis. Rondonópolis, Mato Grosso. 2021. $n=400$

Parameter	Self-reported Covid-19		p-value
	No N (%)	Yes N (%)	

Total	323 (80.75)	77 (19.25)	
Sex			
Female	231 (81.9)	51 (18.1)	0.43
Male	92 (78.0)	26 (22.0)	
Age in years			
18–39	142 (78.5)	39 (21.5)	0.50
40–59	129 (81.1)	30 (18.9)	
60 or older	49 (86.0)	8 (14.0)	
Self-reported skin-color			
White	79 (79.8)	20 (20.2)	0.61
Mixed-race	177 (79.4)	46 (20.6)	
Black, Indigenous, and Asian	66 (85.7)	11 (14.3)	
Marital status			
No partner	168 (82.4)	36 (17.6)	0.48
With a partner	155 (79.1)	41 (20.9)	
Years of schooling			
≤ 5	102 (85.7)	17 (14.3)	0.26
6 to 8	18 (78.3)	5 (21.7)	
≥ 9	203 (78.7)	55 (21.3)	
Household income			
Up to one minimum wage	136 (86.1)	22 (13.9)	0.06
Two or more minimum wages	185 (77.1)	55 (22.9)	
Number of household members			
Up to three	215 (80.2)	53 (19.8)	0.80
Four or more	108 (81.8)	24 (18.2)	
Employment status			
Retired	41 (83.7)	8 (16.3)	
Unemployed	140 (86.4)	22 (13.6)	0.02
Formal or informal work	142 (75.1)	47 (24.9)	
Worked in an essential activity during the pandemic			
No	281 (81.2)	65 (18.8)	0.68
Yes	42 (77.8)	12 (22.2)	
Number of household members who left home for work			
Up to one	199 (83.3)	40 (16.7)	0.15
Two or more	124 (77.0)	37 (23.0)	
Private health insurance			
No	282 (83.4)	56 (16.6)	<0.01
Yes	41 (66.1)	21 (33.9)	
Comorbidity			
Yes	113 (79.6)	29 (20.4)	0.75
No	210 (81.4)	48 (18.6)	
Number of comorbidities			
One	87 (80.6)	21 (19.4)	
Two or more	26 (76.5)	8 (23.5)	0.78
None	210 (81.4)	48 (18.6)	

The results showed that self-reported laboratory Covid-19 diagnosis among FHS users was associated with income (OR: 0.54; 95%CI: 0.32–0.94), employment status (OR: 2.11 (1.21–3.68), and having private health insurance (OR: 0.39; 95%CI: 0.21–0.71). The sociodemographic characteristics “lower income” and “not having a private health insurance” were identified as protective factors against self-reported laboratory Covid-19 diagnosis. However, individuals who engaged in formal or informal work during the pandemic were 2.11 times more likely to report a history of Covid-19 (Table 2).

Table 2. Bivariate analysis of Primary Health Care users' characteristics according to self-reported laboratory Covid-19 diagnosis. Rondonópolis, Mato Grosso. 2021. n=400

Parameter	OR (95%CI)	p-value
Sex		
Male	1.28 (0.75–2.18)	0.36
Female	1	
Age group in years		
18–39	1	
40–59	0.85 (0.5–1.44)	0.54
60 or older	0.59 (0.26–1.36)	0.21
Marital status		
No partner	1	
With partner	1.23 (0.75–2.03)	0.40
Years of schooling		
≤ 5	0.62 (0.34–1.11)	0.10
6 to 8	1.03 (0.36–2.89)	0.96
≥ 9	1	
Monthly family income		
Up to one minimum wage	0.54 (0.32–0.94)	0.02
Two or more minimum wages	1	
Employment status		
Retired	1.24 (0.51–3.00)	0.63
Formal or informal work	2.11 (1.21–3.68)	0.009
Unemployed	1	
Worked in an essential activity during the pandemic		
No	1	
Yes	1.24 (0.62–2.48)	0.55
How many people left home for work		
Up to one	1	
Two or more	1.48 (0.9–2.45)	0.12
Private health insurance		
No	0.39 (0.21–0.71)	<0.01
Yes	1	
Comorbidity		
Yes	1.12 (0.67–1.88)	0.65
No	1	
Number of comorbidities		
One	1	
Two or more	1.27 (0.51–3.21)	0.60

OR: Odds Ratios; 95%CI: 95% confidence interval

Most research participants who reported having received a Covid-19 diagnosis self-reported their health status as good (50.65%) and had no comorbidities (62.34%). The most commonly used diagnostic method was RT-PCR (48.05%), performed mainly at sentinel health units (59.74%). Over half of users (59.74%) did not receive follow-up care from the basic health unit, 93.51% were not hospitalized, and no patients were admitted to an Intensive Care Unit (Table 3).

Table 3. Clinical characteristics of Primary Health Care users with self-reported laboratory Covid-19 diagnosis. Rondonópolis, Mato Grosso, 2021. N=77

Parameter	N (%)
Health status	
Good	39 (50.65)

Very good	04 (05.19)
Regular	31 (40.26)
Poor	03 (03.90)
Comorbidities	
Yes	29 (37.66)
No	48 (62.34)
Diagnostic method	
RT-PCR	37 (48.05)
Rapid test (antigen or antibodies)	25 (32.47)
Serology	15 (19.48)
Location of testing	
Sentinel health unit	46 (59.74)
Private laboratory	21 (27.28)
Emergency Care Unit	05 (06.49)
Other	05 (06.49)
Follow-up from the basic health unit	
No	46 (59.74)
Yes	31 (40.26)
Hospitalization	
Yes	05 (06.49)
No	72 (93.51)

The most frequent clinical symptoms in the study population were: myalgia (n=44; 57.14%), fever (n=39; 50.64%), and headache (n=37; 48.05%) (Figure 1).

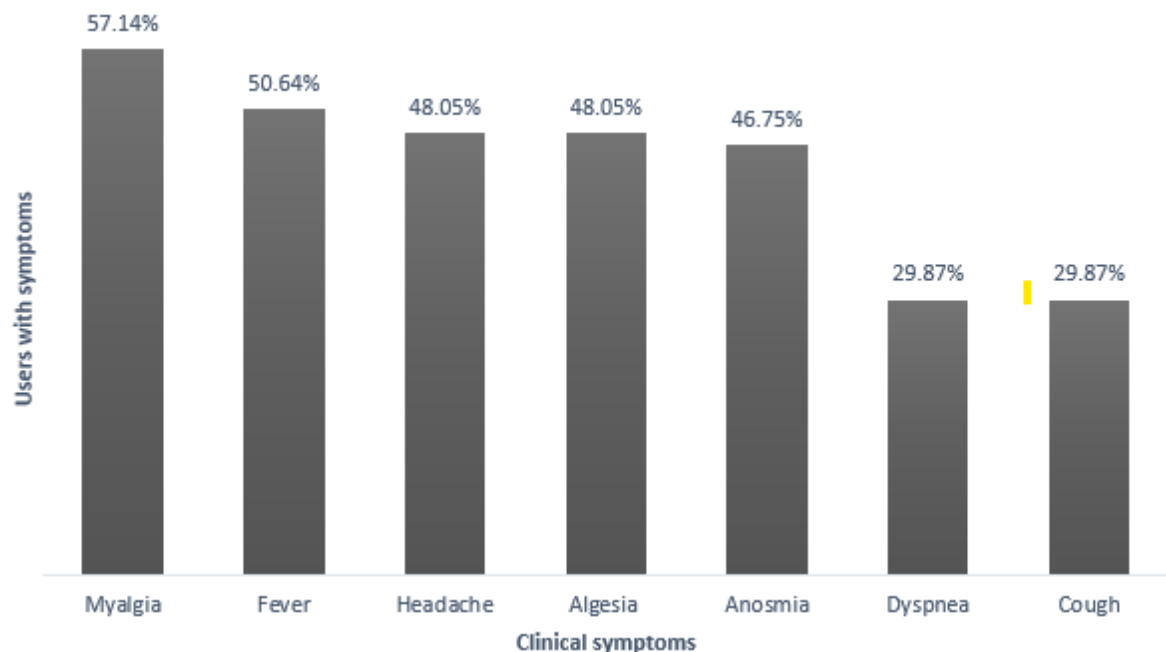


Figure 1. Clinical symptoms presented by Primary Health Care users who self-reported laboratory Covid-19 diagnosis. Rondonópolis, Mato Grosso, 2021.

DISCUSSION

This study was conducted during the second year of the Covid-19 pandemic and highlights the association between social factors and self-reported Covid-19 diagnosis among PHC users in the municipality of Rondonópolis, Mato Grosso. The study findings showed that

engaging in formal and informal work was associated with a higher likelihood of self-reported Covid-19. In Brazil, eight to nine million individuals transitioned to remote work; however, over 24 million were unable to work from home, either due to informal employment or self-employment.¹⁴ Another study emphasized that the vast majority of individuals infected by SARS-CoV-2 are workers, migrants, or people with limited access to health services or without social protection in their workplaces.¹⁵

Individuals engaged in formal or informal work may be more likely to contract Covid-19, as occupational exposure can increase the circulation of the virus. In Brazil, economic pressures to avoid social isolation, poor sanitary conditions in the workplace, failures in the implementation of preventive measures, and delays in vaccination have negatively impacted workers' health.¹⁶ Adherence to biosafety measures among the working population should be intensified; moreover, it is essential to promote health education actions within PHC territories to guide this population group and prevent infections, given their higher probability of exposure to the virus.

Among the PHC users studied, those with higher monthly household income and private health insurance had a higher probability of having a laboratory diagnosis for Covid-19. These factors likely contributed to increased access to health and diagnostic services. The *Sala de Situação Fiocruz Covid nas Favelas* (FIOCRUZ Covid-19 in Favelas Situation Room) monitored epidemiological and social aspects of Covid-19 in favelas within the metropolitan area of Rio de Janeiro and found that both case numbers and deaths were higher in areas without favelas or with low favela concentration. It is believed that this pattern was related to a context of low testing coverage, in which residents of wealthier neighborhoods would be more likely to pay for diagnostic tests.¹⁷

The main social conditioning factors that promote inequity in access to health services are income and education. Higher income may be linked to better recognition of health needs, facilitating the search for access to health services.¹⁸ A study using data from the Brazilian National Survey of Health identified that not having private health insurance was associated with poor access to health services among the Brazilian population aged 19 and older.¹⁹

A study conducted in Wuhan, China, found that the most common symptoms in the early days of SARS-CoV-2 infection were fever, cough, dyspnea, and myalgia.^{6,20} These data are also confirmed in Brazilian studies.^{21,22} Similarly, these clinical signs were the most prevalent among PHC users in Rondonópolis with a history of laboratory Covid-19 diagnosis. Furthermore, a significant portion of the studied population had anosmia and ageusia. In the

early phases of the pandemic, these clinical manifestations were considered markers for disease screening, since they are absent in other respiratory diseases.²³

Sentinel health units were established in Rondonópolis after the sudden increase of Covid-19 cases in the municipality, aiming to minimize transmission among the population, as well as to diagnose and treat the disease. Health units in strategic locations around the city were transformed into sentinel units to serve the population. In this research, it was observed that the sentinel network was the most sought-after health service for Covid-19 diagnosis. In this sense, the importance of the Brazilian Unified Health System (SUS) in facing the pandemic is highlighted.

The Brazilian primary health care model, structured in family health teams and with a territorial focus, was essential in the care network during the pandemic. Despite its undeniable contribution, this health system faced many challenges, such as low integration between PHC and other levels of care in the network, illness among health professionals, weak bond with users, and insufficient mediation of intersectoral actions to address social determinants.²⁴

The limitations of the study include convenience sampling, which affects the homogeneity of the sample population, as well as the limited number of users who reported a Covid-19 diagnosis. Another factor to be mentioned is the self-reported diagnosis, which may suffer from recall bias, as well as the description of clinical manifestations, which were also reported without validation of clinical data. Thus, future longitudinal studies should be conducted, including a more representative sample to better contribute to the understanding of the epidemiology of Covid-19 and its impacts in the post-pandemic period.

This study demonstrates that factors associated with a positive Covid-19 diagnosis were: performing formal or informal work, higher income, and having a private health insurance plan. Mild cases of the disease predominated, and sentinel health units were the main health service used by the population in PHC territories for Covid-19 diagnosis. The results show the impact of social issues during the pandemic, in addition to highlighting the importance of services offered by SUS in this context. It is essential that public policies are formulated to ensure access to healthcare for the entire population as a way to minimize social inequalities, especially during public health crises.

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Authors' contributions:

Letícia Silveira Goulart contributed to the design, data analysis, writing, review, and correction of the manuscript. **Giulia Elena Tessaro** contributed to data collection and analysis, writing, and review of the manuscript. **Ingrid Rodrigues Xavier Docusse** contributed to data collection and analysis, writing, and review of the manuscript. **Ricardo Alves Olinda** contributed to the statistical analyses, review, and correction of the manuscript. **Magda de Mattos** contributed to the conception, data analysis, writing, review, and correction of the manuscript.

All authors have approved the final version to be published and are responsible for all aspects of the study, including ensuring its accuracy and completeness.