

Assessment of SARS-CoV-2 infection in a basic health service unit in Araçatuba, São Paulo, Brazil

Incidência de infecção por SARS-Cov-2 em uma unidade básica de Saúde de Araçatuba, São Paulo, Brasil

Marco de Luca Monteiro Sturaro¹ , Leandro Figueiredo dos Santos² , Laura Emília Michelin Gobbo³ , Ana Claudia Soncini Sanches² , Walter Berthequini Nagata⁴ , Aparecida de Fátima Michelin² 

1. Discente do Curso de Especialização em Vigilância Laboratorial em Saúde Pública do Instituto Adolfo Lutz (IAL), Araçatuba, SP, Brasil. 2 Docente do Instituto de Ciências da Saúde da Universidade Paulista (UNIP), Araçatuba, SP, Brasil. 3 Discente do curso de Medicina do Centro Universitário São Camilo (CUSC), São Paulo, SP, Brasil. 4 Assistente agropecuário na Secretaria de Agricultura e Abastecimento do Estado de São Paulo da Coordenadoria de Defesa Agropecuária, Lins, SP, Brasil.

Abstract

Objective: to describe risk factors associated with SARS-CoV-2 infection. **Methods:** this is a retrospective descriptive cross-sectional study aimed at describing the epidemiological profile of laboratory and clinical diagnosis of unvaccinated patients seen at a basic health unit in Araçatuba – SP, infected with SARS-CoV-2 between June 2020 and January 2021. The results were analyzed through inferential and descriptive statistics. Additionally, Chi-square and Fisher exact tests were used ($p < 0.05$). **Results:** of 313 patients, 128 were positive for COVID-19, with 68.75% diagnosed by RT-PCR and the others by immunochromatography. Women were 51.56% of those infected with adults corresponding to the main age group (76.56%), and 57% of patients had only a basic educational level concluded. A total of 88.26% of the patients progressed to cure without complications; eight patients died, most of whom were men and elderly. Of the variables analyzed for positive/negative outcomes, only “basic educational level” was significant for a positive result ($p = 0.0019$). **Conclusion:** the deaths of infected patients may be associated with the existence of at least one comorbidity and advanced age of men.

Keywords: Risk Factor; Comorbidity; COVID-19 Pandemic; SARS-CoV-2 Infection.

Resumo

Objetivo: descrever os fatores de risco associados com a infecção por SARS-CoV-2. **Métodos:** trata-se de um estudo descritivo retrospectivo e transversal, voltado a descrever o perfil epidemiológico de diagnóstico laboratorial e clínico, de pacientes não vacinados, atendidos em uma unidade básica de saúde de Araçatuba-SP, infectados por SARS-CoV-2, no período entre junho de 2020 e janeiro de 2021. Os resultados foram analisados por estatística inferencial e descritiva. Adicionalmente, foram aplicados os testes de Qui-quadrado e exato de Fisher ($p < 0.05$). **Resultados:** dos 313 pacientes, 128 apresentaram resultado positivo para COVID-19, com 68,75% diagnosticados por RT-PCR e o restante por imunocromatografia. Mulheres foram 51,56% dos infectados, com adultos correspondendo à principal faixa etária (76,56%), 57% dos pacientes apresentavam apenas o nível educacional básico concluído. O quadro de 88,26% dos pacientes evoluiu para cura sem complicações; 8 pacientes foram a óbito, sendo, em sua maioria, homens e idosos. Das variáveis analisadas para grau de dependência de resultado positivo/negativo, apenas “nível escolar básico” apresentou resultado significativo para resultado positivo ($p = 0.0019$). **Conclusão:** os óbitos dos pacientes infectados podem ser associados à existência de, pelo menos, uma comorbidade e à idade avançada de homens.

Palavras-chave: Fator de Risco; Comorbidade; Pandemia COVID-19; Infecção por SARS-CoV-2.

INTRODUCTION

Coronavirus disease 2019 (COVID-19), a respiratory disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), was notified to the World Health Organization (WHO) in December 2019 from an outbreak in the city of Wuhan, China¹. The first case reported to health authorities in Latin America occurred in São Paulo, Brazil, in February 2020². On March 11, 2020, the WHO officially declared the disease a pandemic³. With this, the need to adopt measures to contain the virus became evident, and strategies were outlined to protect people, especially those considered at risk⁴.

Thus, methods that included basic hygiene practices, such as proper handwashing, reduced physical contact or social distancing, and the use of masks for respiratory isolation against

aerosols were implemented⁵. Citizens' willingness to use and accept these measures is determined by their educational level, which allows them to understand the risk they face and contributes to their decision-making and risk management. This is particularly true in Brazil, where the government's management of the pandemic was considered one of the worst in the world⁶.

The level of education of the Brazilian population may have been a contributing factor to the lower-than-expected adherence by some to basic protocols, reflecting on the mortality rate associated with COVID-19⁷. A low educational level among adults, which generally occurs in countries with unstable health systems, results in individuals who are less responsive to health

Correspondence: Marco de Luca Monteiro Sturaro. Address: Francisco Gonzaga Cícero de Sá, 39 – Araçatuba – SP – 16010020. E-mail: marcodeluca.bio@gmail.com

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education and, therefore, less likely to comply with disease prevention measures, when compared to citizens with a higher level of education⁸.

The new pandemic has also prompted a rethinking of formal education and health education to improve health literacy⁹. A health-literate society can understand the seriousness of the situation and adopt protective measures. These measures are usually simple actions based on clear and objective information and are made available by various segments of health information providers¹⁰.

Furthermore, biological host factors, including age, sex, and comorbidities such as metabolic and cardiovascular diseases, influence disease severity and progression^{11,12}. The existence of any comorbidity is considered an important risk factor, with the worst clinical outcomes occurring in the presence of multiple comorbidities¹³.

Although most cases of COVID-19 are not considered serious and some may also be asymptomatic¹⁴, the most severe cases have occurred in older adults¹⁵. Immunological changes that normally occur during the aging process contribute to this group's increased vulnerability to various infections¹⁶. Additionally, there is strong epidemiological evidence that suggests that male sex is also an important risk factor for the severity of this disease^{17,18}.

The search for an association between COVID-19 cases and the characteristics of those affected, such as the presence of previous comorbidities and socioeconomic conditions, is critical to better understand the disease, and develop preventive measures, both for COVID-19 and future pandemics. Thus, this study aimed to evaluate a sample of the population of Araçatuba treated at a basic health unit (BHU), using the personal and social data of the individuals and sought to characterize this group and find relevant associations between the risk factors and the development of the disease.

METHODS

This study utilized a descriptive, retrospective, cross-sectional design to assess the contributing factors of SARS-CoV-2 infection in a BHU in Araçatuba located in the northwest region of São Paulo, a state in the Southeast region of Brazil. It was approved according to Embodied Opinion No. 4.781.346 by the Research Ethics Committee of the Universidade Paulista, which was developed in a BHU in Araçatuba, São Paulo, Brazil.

From June 2020 to January 2021, the medical records of patients with COVID-19 symptoms who had not received any dose of vaccine for immunization against SARS-CoV-2 and were assisted by the Family Health Strategy were included in the study. Data on sex, age, educational level, type of laboratory test used to detect SARS-CoV-2, preexisting comorbidities, and clinical progression (classified as cured or dead) were collected to develop a clinical and sociodemographic profile of the individuals. Furthermore, information about the residence or household of infected individuals was also collected to

characterize their social environment.

The results were analyzed using descriptive and inferential statistics. The sociodemographic characteristics calculated were analyzed using frequency count and percentages of the data. Additionally, chi-square and Fisher's exact test were used to verify the association between the results of the diagnoses for COVID-19 of the evaluated patients and the variables of interest. Confidence intervals (CI) were calculated by the proportion of positive and negative results in each category of variables analyzed. Statistical significance was set at $p < 0.05$.

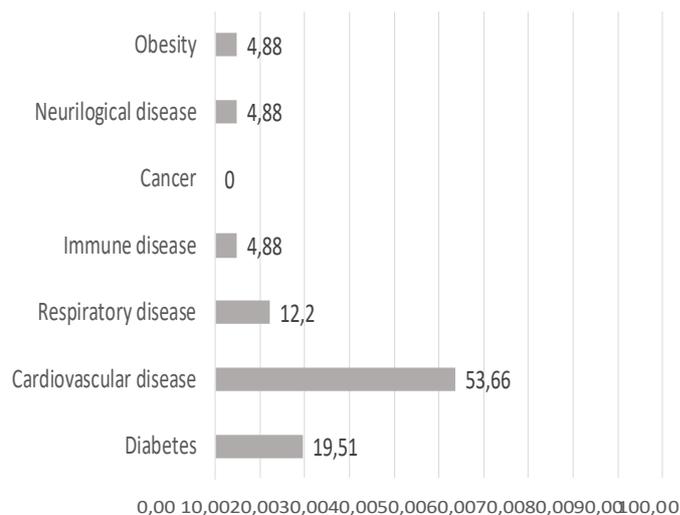
RESULTS

The medical records of 313 patients with suspected COVID-19 treated at the BHU were evaluated. A total of 128 patients tested positive for SARS-CoV-2. According to the laboratory data, reverse transcription polymerase chain reaction (RT-PCR) was used to test 68.75% of the samples, while the rest underwent an immunochromatographic test (rapid test).

Females made up 51.56% of the positive patients, with adults accounting for 76.56% (n=98) followed by the elderly (12.50%) and young individuals (10.94%). In terms of education, most individuals (57.81%) declared that they had received some level of education (basic, elementary, and/or high school); 14.06% had received a higher level of education, and 3.91% of the individuals reported having no education.

At the time of evaluation, all positive patients were symptomatic, and while the majority were cured (88.26%), eight deaths were recorded. It is noted that the majority of the sample did not present with any comorbidity (77.34%), and cardiovascular disease was the most prevalent (29.27%) in those who reported the presence of a pre-existing pathology (Figure 1). All clinical and sociodemographic characteristics are described in Table 1.

Figure 1. Presence of comorbidities in patients infected with SARS-CoV-2 treated at a basic health unit in a Araçatuba, São Paulo, Brazil (June 2020–July 2021).



Source: authors, 2021

Table 1: Clinical and sociodemographic characteristics of 128 patients infected with SARS-CoV-2- treated at a basic health unit in Araçatuba, São Paulo, Brazil (June 2020-July 2021).

Variables	N	%
Sex		
Female	66	51.56
Male	62	48.44
Age group		
Young	14	10.94
Adult	98	76.56
Elderly	16	12.5
Test type		
Rapid test	40	31.25
RT-PCR	88	68.75
Test result		
Negative	0	0
Positive	128	100
Education		
Uninformed	31	24.22
None	5	3.91
School-Level	74	57.81
University education	18	14.06
Sum of comorbidities		
0	99	77.34
1	19	14.84
2	5	3.91
3	3	2.34
4	1	0.78
5	1	0.78
Outcome		
Cure	113	88.28
Aggravation / Cure	7	5.47
Death	8	6.25

Source: author, 2021

When the characteristics of the individuals who died were analyzed, it was observed that 75% were male (n=6), in the elderly age group (n=7; 87.5%), with some educational level (n=5; 62.5%), and the presence of at least one comorbidity, as shown in Table 2.

When the variables were analyzed according to the degree of dependence for positive and negative results, it was observed that there was no influence on sex (p=0.2046), presence of comorbidities (p=0.3922), and type of household (p=0.7171) for these results. Age group and schooling data showed the proportion of positive results was significantly higher for older individuals (adults and elderly) (p=0.0339) compared to young people and with a significant difference concerning the level of schooling with the highest number of positive patients with some level of education (p=0.0019), as described in Table 3.

Table 2. Clinical and sociodemographic characteristics of the eight patients who progressed to death following infection with SARS-CoV-2 at a basic health unit in Araçatuba, São Paulo, Brazil (June 2020-July 2021).

Variables	N	%	
Sex	Female	2	25
	Male	6	75
Age group	Young	0	0
	Adult	1	12.5
	Elderly	7	87,5
Test type	Rapid test	4	50
	RT-PCR	4	50
Test result	Negative	0	0
	Positive	8	100
Education	None	3	37.5
	School-Level	5	62,5
Sum of comorbidities	0	0	0
	1	4	50
	2	1	12.5
	3	2	25
	4	0	0
	5	1	12.5

Variables	Categoria	Testresults for SARS-CoV-2									Total	%	P	
		Positive	%	CI 95%			Negative	%	CI 95%					
Sex	Female	66	37.50	0.31	-	0.45	110	62.50	0.55	-	0.69	176	100	0.20461
	Male	62	45.26	0.36	-	0.53	75	54.74	0.46	-	0.63	137	100	
	Total	128	40.89	0.36	-	0.46	185	59.11	0.54	-	0.64	313	200	
Age group	Young	14	25.45	0.16	-	0.38	41	74.55	0.62	-	0.84	55	100	0.03391
	Adult	98	44.75	0.38	-	0.51	121	55.25	0.49	-	0.62	219	100	
	Elderly	16	41.03	0.27	-	0.57	23	58.97	0.43	-	0.73	39	100	
	Total	128	40.89	0.36	-	0.46	185	59.11	0.54	-	0.64	313	300	
Education	None	5	17.24	0.08	-	0.35	24	82.76	0.65	-	0.92	29	100	0.00191
	School-Level	74	45.96	0.39	-	0.55	87	54.04	0.46	-	0.62	161	100	
	Universityeducation	18	62.07	0.44	-	0.77	11	37.93	0.23	-	0.56	29	100	
	Total	97	44.29	0.39	-	0.52	122	55.71	0.49	-	0.62	219	300	
Sum of comorbidities	0	99	38.82	0.33	-	0.45	156	61.18	0.55	-	0.67	255	100	0.39222
	1	19	46.34	0.32	-	0.61	22	53.66	0.39	-	0.68	41	100	
	2	5	50.00	0.24	-	0.76	5	50.00	0.24	-	0.76	10	100	
	3	3	60.00	0.23	-	0.88	2	40.00	0.12	-	0.77	5	100	
	4	1	100	0.21	-	1	0	0.00	0.00	-	0.79	1	100	
	5	1	100	0.21	-	1	0	0.00	0.00	-	0.79	1	100	
	Total	128	40.89	0.36	-	0.46	185	59.11	0.54	-	0.64	313	600	
Householdtype	Apartment	24	38.10	0.27	-	0.50	39	61.90	0.50	-	0.73	63	100	0.71711
	House	104	41.60	0.36	-	0.48	146	58.40	0.52	-	0.64	250	100	
	Total	128	40.89	0.36	-	0.46	185	59.11	0.54	-	0.64	313	200	

P-values were calculated by the 1 chi-square and 2 Fisher's exact test.

*94 patients did not inform the education level.

Source: authors. 2021

DISCUSSION

Despite the higher proportion of females, the occurrence of COVID-19 in the population of Araçatuba, represented by 313 residents of a micro-region and treated at a BHU, showed no statistical difference correlating positive results and sex (male=48.44% and female=51.56%). According to the Brazilian Institute of Geography and Statistics (IBGE) 2010 census,¹⁹ the majority of the population in the city mostly comprises women (51.9%). However, it is important to be vigilant about the effect of the pandemic on the female population, especially in communities where females are vulnerable. According to Gausman & Langer, public health actions aimed at the female population, given their inherent needs, should not be marginalized in favor of a holistic approach to control the pandemic²⁰.

In the study, most patients with SARS-CoV-2 were adults and had some level of education. This is consistent with the IBGE 2010 census which shows that the population is composed of mostly adults. However, it has been estimated that such individuals have greater health responsibility and situational awareness to avoid infection.^{7,8} Given the variety of infection rates between populations, a broader assessment of the severity of SARS-CoV-2 infection, including more comprehensive serological surveys of the population by age group, should be conducted²¹.

There are significant differences in people's perceptions, beliefs, and behaviors towards SARS-CoV-2 infection, which can make them more vulnerable to infection and complicate efforts to limit viral transmission²². Interpreting official SARS-CoV-2 pandemic news and recommendations was difficult, especially towards the beginning of the pandemic in 2020 because of the high degree of uncertain information being conveyed. A major challenge for individuals is the integration of this information into personal behavioral actions. During a crisis such as the COVID-19 pandemic, critical health literacy, which allows for reflection and evaluation of accessible information, can help to promote, enhance, and encourage more suitable behaviors²³.

There was a massive virtual campaign of misinformation at the beginning of the COVID-19 pandemic, particularly in Brazil, involving fake news of government pronouncements defending proven ineffective treatments and discouraging the use of masks and social isolation; this created a false sense of security and reduced adherence to WHO-recommended health measures^{24,25}.

In Brazil, the quality of primary public education is low in comparison to the rest of the world, as evidenced by PISA (Program for International Student Assessment), being equivalent to one out of six existing levels; this scenario contributes to a greater vulnerability of the Brazilian population to the disease, including adults and literate individuals²⁶.

This study showed that most of the infected patients had a positive clinical outcome, with 88.28% (n=113) being cured without the need for hospitalization or occurrence of sequelae, while 5.47% (n=7) of the patients required hospitalization and rehabilitation and 6.25% (n=8) died; this was a high percentage compared to that observed in others regions of Brazil, which included 2.77% (n=616,000) deaths until December 2021²⁷. However, the heterogeneous characteristics of different locations, as well as the incomplete provision of data, may prevent direct comparisons of our sample with other scenarios across the country.

The vast majority of those infected did not have comorbidities (77.34%), in line with the National Health Survey, which points out that 52% of the Brazilian adult population has some comorbidity.²⁸ For the minority with pre-existing diseases, cardiovascular diseases were predominant (53.66%), followed by diabetes mellitus (19.51%). According to Evans (2020), systemic arterial hypertension, diabetes mellitus, and obesity are factors that amplify the risk of the disease; thus, the majority (88.28%) of outcomes were benign for COVID-19 in an unvaccinated population.

When the characteristics of the individuals who died were analyzed, the presence of at least one comorbidity was observed, with the majority being male (75%), elderly (87.5%), and with some educational level (62.5%). These aspects corroborate findings in the literature that point to a tendency for the disease to occur with greater severity among older adults¹ and male patients in some samples^{17,18}.

The present work presents a comparative component between the various Brazilian sociodemographic conditions affected by the COVID-19 pandemic. However, the specific sample corresponds to patients handled by one Family Health Strategy team in a BHU in a city located in the northwest region of São Paulo state. In the future, a new analysis of this sample is important to verify if there was a change in the scenario after the initiation of vaccination.

CONCLUSION

The sociodemographic characteristics and clinical data showed that educational level had no relationship with the development of infection. In addition, post-infection patient deaths might be attributed to at least one comorbidity and old age in men.

This study can be configured as another comparative component between the different scenarios affected by COVID-19 in the pre-vaccination period.

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