Deaths and confirmed cases of COVID-19 in a town in the Brazilian Amazon

Óbitos e casos confirmados de COVID-19 numa cidade da Amazônia brasileira

Muertes y casos confirmados de COVID-19 en una ciudad de la Amazonia brasileña

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Objective: to investigate indicators of contamination and deaths due to COVID-19, in a state capital, located in the Brazilian Amazon. **Methods:** quantitative, descriptive research, carried out based on data collection regarding cases of deaths and confirmed cases, in epidemiological bulletins, in the city of Porto Velho, Rondônia, Brazil, considering the years 2020 and 2021. **Results:** it was possible to verify that there is a higher rate of contamination in the population aged between 30 and 49 years (26.0%), affecting predominantly females (54.9%), and deaths in the age group between 60 and 79 years (23.5%), mainly males (60.3%). **Conclusion:** the increase in cases and deaths coincided with the abandonment of social isolation measures.
Descriptors: COVID-19; Pandemics; Social behaviors.

Objetivo: investigar indicadores de contaminação e óbitos por COVID-19, numa capital estadual, situada na Amazônia brasileira. **Método**: pesquisa quantitativa, do tipo descritiva, realizada a partir de levantamento de dados a respeito dos casos de óbitos e casos confirmados, em boletins epidemiológicos, na cidade de Porto Velho, Rondônia, Brasil, considerando os anos de 2020 e 2021. **Resultados**: verificou-se maior índice de contaminação na população da faixa etária de 30 a 49 anos (26,0%), atingindo predominantemente o sexo feminino (54,9%), e os óbitos na faixa etária de 60 a 79 anos (23,5%), principalmente o sexo masculino (60,3%). **Conclusão**: o aumento de casos e mortes coincidiu com o abandono das medidas de isolamento social.
Descritores: COVID-19; Pandemias; Comportamento social.

Objetivo: investigar indicadores de contaminación y muertes por COVID-19 en una capital de estado localizada en la Amazonia brasileña. **Método**: investigación cuantitativa, descriptiva, basada en el levantamiento de datos de muertes y casos confirmados, en boletines epidemiológicos, en la ciudad de Porto Velho, Rondônia, Brasil, considerando los años 2020 y 2021. **Resultados**: hubo una mayor tasa de contagio en el grupo de edad de 30 a 49 años (26,0%), afectando predominantemente al sexo femenino (54,9%), y de muertes en el grupo de edad de 60 a 79 años (23,5%), afectando principalmente al sexo masculino (60,3%). **Conclusión**: el aumento de casos y muertes coincidió con el abandono de las medidas de aislamiento social.
Descriptores: COVID-19; Pandemias; Conducta social.

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INTRODUCTION

The 21st'century was marked by the emergence of the COVID-19 pandemic, a disease that had already reached more than 50 countries, since its first confirmed case in humans, in December 2019, until the official declaration of a pandemic by the World Health Organization (WHO), in March 2020. SARS-CoV-2, which causes COVID-19, is a highly transmissible[1] pathogen, which is more likely to develop into lethal cases in adults and elderly people with comorbidities.

SARS-CoV-2 causes symptoms similar to SARS-Cov, a virus that caused an outbreak in China between 2002 and 2003 and inspired a study[2], which linked the emergence of SARS-CoV in humans with the consumption and handling of game animals. Anticipating the return of SARS, the work reviewed the biology of the virus, treatment options, immunization, infection control, among others, and served as a reference for fighting the COVID-19 virus. Although they have symptoms in common, airborne transmission of SARS is considered uncommon, with the general risk of transmission being 1 in 156[2], while SARS-Cov-2 can be transmitted by air.

The first case of COVID-19 was also confirmed in China, in 2019, and the virus quickly spread to other countries around the world. While WHO declared the COVID-19 pandemic in March, Brazil had already declared the virus a public health emergency on February 6, 2020. As of May 6, 2020, there were 116,243 (one hundred and sixteen thousand, two hundred and forty-three) confirmed cases of COVID-19, and 8,014 (eight thousand and fourteen) deaths in Brazil, with approximately 22% of total cases[3] in the Northern region alone. It is believed that, in Brazil, the effects of the COVID-19 pandemic resonated with implications of both an economic and social crisis[4], since the rapid spread in the country has highlighted social inequalities, with high rates of contamination in vulnerable communities.

While following quarantine measures was impossible for some people, due to the issue of socioeconomic vulnerability, which required the continuation of work activities, others considered the measures unnecessary, an understanding strengthened by denialist actions by the Brazilian authorities. The spread of fake news contributed to the strengthening of science denial in regards to the pandemic, leading to disbelief, by a percentage of the population, in scientific studies, which sought to minimize the impacts of the pandemic. Fake news is defined as "false stories that appear to be news, spread on the Internet or other media, generally created to influence political views or as a joke"[5:2].

Paying attention to the behavior of this pandemic is essential for updating coping strategies, such as an emergency and its repercussions at the local level[6]. In this sense, this

article aims to investigate indicators of contamination and deaths due to COVID-19 in a state capital located in the Brazilian Amazon.

METHODS

This is quantitative research[7], which seeks results through the analysis of primary data, which allows statistical analysis to be carried out. Due to the public nature of the data, there was no need to submit the research for consideration by the Human Research Ethics Committee (*Comitê de Ética em Pesquisa com Seres Humanos* - CEP).

To present the results, the descriptive approach[6] was used to gather and analyze information. The selected indicators were: age group, sex, deaths and confirmed cases. Data collection was carried out from March 2 to April 24, 2022, in epidemiological bulletins made available by the Brazilian Department of Health Surveillance (*Departamento de Vigilândia em Saúde* - DVS), which reported the spread of COVID-19 in the city of Porto Velho.

Porto Velho is the capital of the state of Rondônia, located in the Northern Region of Brazil and borders the states of Acre, Amazonas and Mato Grosso. According to the Brazilian Institute of Geography and Statistics (*Instituto Brasileiro de Geografia e Estatística* - IBGE), Porto Velho has a territorial area of 34,091 km^2 (thirty-four thousand ninety-one square kilometers), an estimated population of 548,952 (five hundred and forty-eight thousand nine hundred and fifty-two) people, and demographic density corresponding to 12.57 inhabitants/km^2.

The research can also be classified as cross-sectional, as the data analyzed refer to the period from 03/15/2020 to 07/24/2021, and were taken from epidemiological bulletins available on the DVS website[8]. The DVS made available, in total, 48 epidemiological bulletins, reporting the progression of the virus in the state. Of these, bulletins 1, 29, 38 and 48 were initially selected, referring to the first and last bulletins of 2020/2021. However, it was observed that Bulletin 48 did not have data on the indicators analyzed, namely age group, sex, deaths and confirmed cases. Therefore, this Bulletin was discarded and replaced by Bulletin 47. The other bulletins were analyzed, but their data was not selected for the research. The results are presented in table and graph form, available in epidemiological bulletins numbers 1 and 29, published in 2020, and numbers 38 and 47, published in 2021.
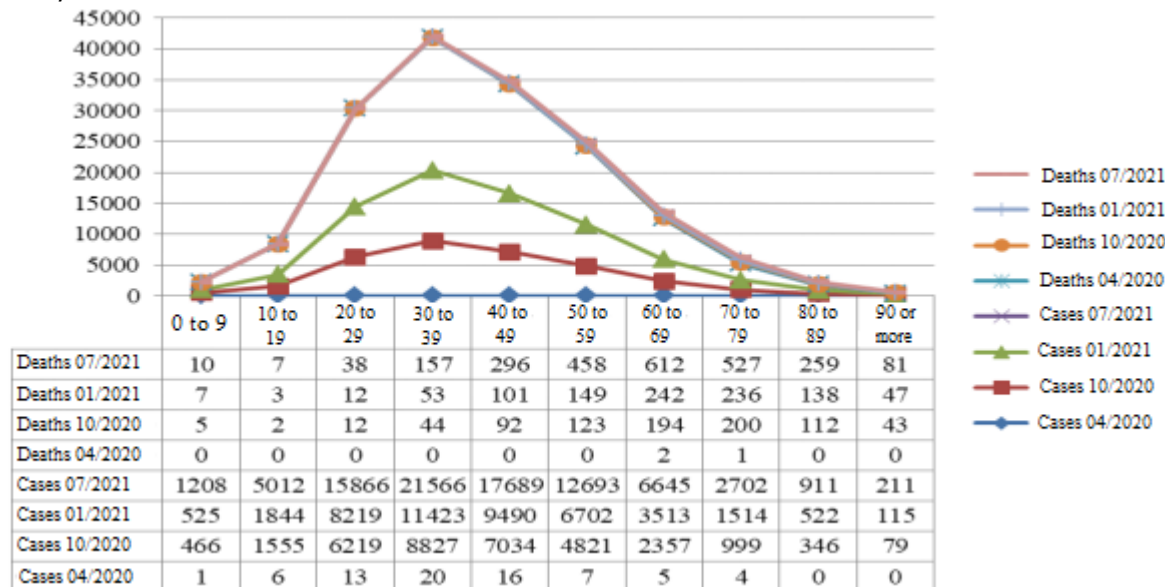
RESULTS

In Porto Velho, the first cases of COVID-19 were confirmed on March 21, 2020. The first autochthonous case, a 66-year-old woman, presented severe respiratory symptoms and died one day after her hospitalization, on the March 29, 2020. In March, it was observed that the

SARS-CoV-2 fatality rate in Porto Velho was higher than that in the state of Rondônia, which could be attributed to the fact that the state capital has a higher population concentration. The cases of COVID-19, according to the variable 'onset of symptoms', began in Epidemiological Week 11 (08 to 14/03/2020), and the Epidemiological Week (EW) with the highest incidence of cases was EW 15 (05 to 04/11/2020), accounting for 52.05% of cases.

In Epidemiological Week 16, COVID-19 had already reached 29 neighborhoods in the capital of Rondônia. When analyzing the indicators selected for research in the first epidemiological bulletin of Porto Velho, it is clear that the highest concentration of confirmed cases was in the age group of 30 to 39 years old (No= 20; 27.4%) and 40 to 49 years old (No=16; 21.9%), as shown in Graph 1. Of these, 58.9% were female and 41.1% were male, while deaths were concentrated in the age group of 60 to 69 years (06; 08.2%) and 70 to 79 years old (04; 05.5%), predominantly affecting males, with 66.7% of cases.

Data for the month of October 2020 showed the maintenance of a predominance of confirmed cases in the age group of 30 to 39 years (No= 8827; 27.0%) and 40 to 49 years (No=7034; 21.5%), and deaths in the age group of 60 to 69 years (No= 2357; 23.5%) and 70 to 79 years (No=200; 24.2%), maintaining the age groups of April of the same year. It can be observed that, in all age groups of confirmed cases, the highest percentage was in females and, in the case of deaths, the highest percentage by age group was in males, except from 10 to 19 years old, whose proportion was equal.

Graph 1. Confirmed cases and deaths from COVID-19, according to age group, Porto Velho/RO, 2020/2021.

|	0 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 or more
Deaths 07/2021	10	7	38	157	296	458	612	527	259	81
Deaths 01/2021	7	3	12	53	101	149	242	236	138	47
Deaths 10/2020	5	2	12	44	92	123	194	200	112	43
Deaths 04/2020	0	0	0	0	0	0	2	1	0	0
Cases 07/2021	1208	5012	15866	21566	17689	12693	6645	2702	911	211
Cases 01/2021	525	1844	8219	11423	9490	6702	3513	1514	522	115
Cases 10/2020	466	1555	6219	8827	7034	4821	2357	999	346	79
Cases 04/2020	1	6	13	20	16	7	5	4	0	0

The first Epidemiological Bulletin of 2021 counted the confirmed cases and deaths due to COVID-19 in the period from 03/15/2020 to 01/02/2021, presenting a comparison with the results recorded in 2020. It was observed that there were no significant changes in the range age of the analyzed indicators: confirmed cases remained higher in the 30 to 39 year old age groups (No= 11423; 26.0%) and 40 to 49 year olds (No= 9490; 21.6%), and with a higher incidence in sex female (54.9%). Deaths also remained more significant in the age groups of 60 to 69 years (No= 242; 23.5%) and 70 to 79 years (No= 236; 24.2%), with a prevalence in males (60.3 %). The Epidemiological Bulletin shows an even higher percentage of confirmed cases in females, except in the 70 to 79-year-old age group, with 50.3% of cases in males.

The last Epidemiological Bulletin of 2021, which presented the indicators necessary for the research, namely age group, sex, deaths and confirmed cases, counted confirmed cases and deaths as of 03/15/2020, caused by the accumulated data. Still, the data presented is similar to that in the first bulletin of 2021.

Graph 2 shows deaths and confirmed cases of COVID-19 in Porto Velho, from March 2020 to September 2021. The confirmed cases peak in June 2020, a drop in transmission of the disease from September onwards, followed by an increase not only in confirmed cases, but also in deaths in February/March 2021.

Graph 2. Epidemiological curve of confirmed cases and deaths due to human infection by SARS-CoV-2. Porto Velho/RO, from March 2020 to September 16, 2021.
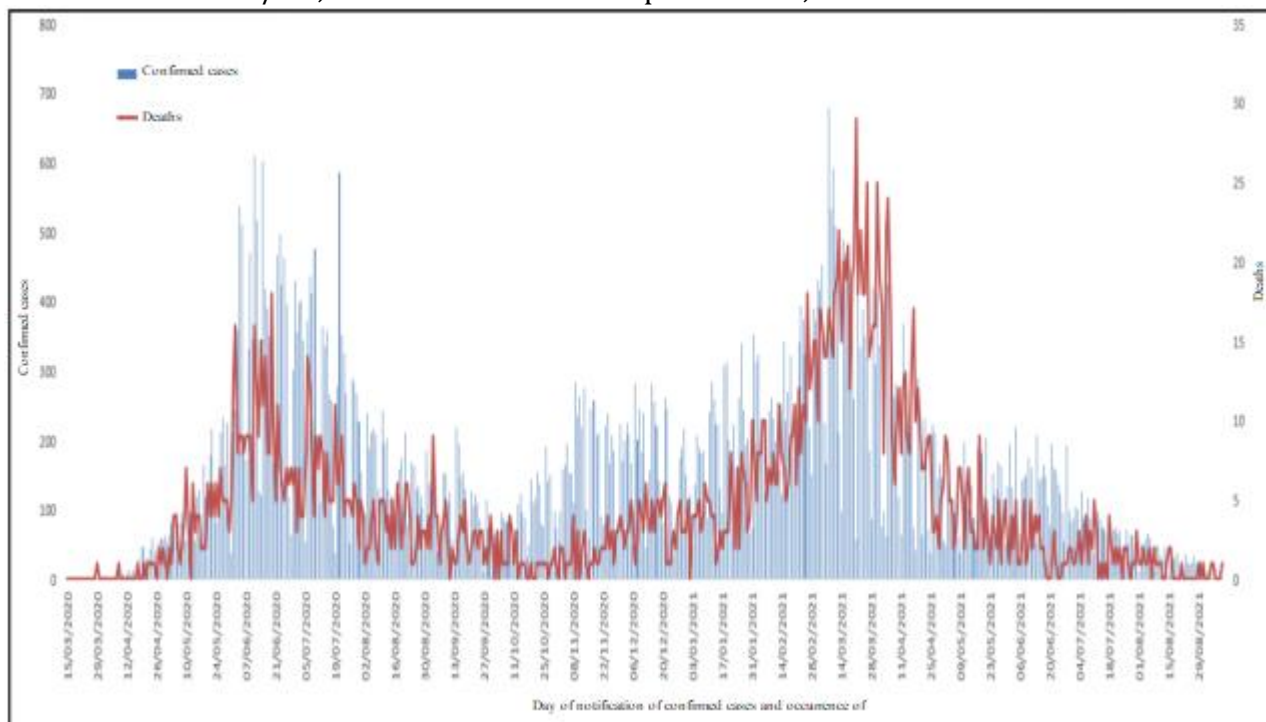
Source: Epidemiological Bulletin 47 (2021).

DISCUSSION

The numerical difference between the indicators 'confirmed cases' (32,713) and 'number of registered deaths' (827) was attributed in studies[9-12] to the low pathogenicity of the virus and transmission by asymptomatic people during the incubation period. In these cases, people infected with COVID-19 who did not show symptoms during the incubation period (time between virus infection and the onset of symptoms) could infect others, which possibly resulted in a large number of infected people, but with deaths more restricted to people in the risk group.

Since the beginning of the pandemic, WHO has recommended social distancing, isolation and the use of personal protective equipment to fight the spread of COVID-19. However, despite the implementation of these measures, Porto Velho recorded an increase in confirmed cases daily, and it was observed that the notification of cases decreased on weekends[9].

In the context of a pandemic, following measures to fight the spread of the virus was essential, especially among the group at highest risk and incidence of mortality[5]. Advanced age was a risk factor for COVID-19 infection, as the chances of progression to Severe Acute Respiratory Syndrome (SARS) increased, with cases often requiring care in the Intensive Care Unit (ICU) and use of mechanical ventilation, which can also result in death[4].

Although deaths have remained concentrated in the same age groups since 2020, it was possible to notice an increase, mainly in contamination, in other age groups, which allowed for questioning the effectiveness of the implementation of safety measures, since even though they were weakened by the beginning of the immunization, should still be encouraged and followed by the population.

COVID-19 evolved more quickly in the presence of comorbidities, such as lung, heart, kidney, neurological diseases, among others, which put the elderly population at risk, as they generally are affected by multiple of these conditions. However, the age group from 60 to 79 years old was not the only one affected by COVID-19 when it came to the progression to death, so a significant number of deaths were observed in other age groups such as 30 to 49 years old. Therefore, it was necessary for the entire population, whether or not they had comorbidities, to correctly follow preventive measures.

Brazil was one of the countries most affected by the coronavirus. The Brazilian government's position and suspicions of being associated with the spread of fake news instigated non-compliance with measures such as isolation/social distancing, use of masks in public places, prohibition of social gatherings, among others; indicating a contradiction between political interests and the preservation of life[13-15]. These behaviors, added to the burdening of the health services structure, constituted factors that favored the spread of the disease in the country.

The spread of false information has become even more worrying in the context of a pandemic: "Pandemics are, in equal measure, caused and stopped by the way people interact socially. Therefore, they have, above all, a social character"[16:4]. Therefore, it is understood that the dissemination of fake news directly harmed the control of the pandemic, as it influenced the behavior of the population, who believed false information to be true. In a survey, the main side effects of the dissemination of fake news were addressed, such as the loss of trust in institutions that present legitimate facts, in addition to the link with the increase in cases and deaths due to the dissemination of proven ineffective practices[5].

A 2021 study showed that 94% of Brazilians interviewed had seen at least one of the fake news about the coronavirus, and 73% believed that at least one of the content containing misinformation was true or probably true[17]. This same study showed that, in Brazil, the Northern region was the most uninformed, with 84% of interviewees believing that at least one of the fake news used in the study was true. This information implies, even after the pandemic is under control, the need for special attention in the development of public policies to fight fake news in the state of Rondônia.

Deaths and confirmed cases during the two years of the pandemic in Porto Velho showed a significant increase in indicators in the second wave of COVID-19 in 2021, when basic information about the virus and the effectiveness of safety measures had already been released in 2020. Therefore, it is possible to relate this increase in the second wave to factors such as the growth in the circulation of fake news, the relaxation of preventive measures, and others.

In Porto Velho, the easing of the pandemic in October 2020 led to the opening of commerce, as well as other establishments, the resumption of activities, such as movie theaters and nightclubs and the permission to hold events with up to two thousand people. However, in January 2021, with cases rising, the state returned to the more restrictive phases of the reopening plan. Despite the start of vaccination, progress was slower than expected. Consequently, the capital of Rondônia recorded days with more than 500 confirmed cases, and 100% occupancy of available hospital beds, which required the transfer of patients to other states in Brazil. Meanwhile, the population was seen disrespecting quarantine every day, which must have influenced the increase in indicators of confirmed cases and deaths in February and March 2021.

It is understood that the pandemic in Porto Velho fluctuated according to the population's behavior associated with the relaxation of preventive measures and the spread of fake news. It is necessary to reinforce that community behavior was one of the crucial factors in preventing an increase in cases and deaths. This is because countries that adopted safety measures later, or that had difficulty controlling the population to comply with behavioral measures, recorded a high increase in confirmed cases and deaths[18]. The relationship between the increase in indicators and the reopening of commerce suggests that the measures implemented needed to be updated with social behavior in mind.

CONCLUSION

Currently, in Brazil, four years have passed since the start of the COVID-19 pandemic, and the pandemic scenario appears to have been controlled with the vaccination of people in various age groups. In any case, studying the population in a pandemic context, as well as the effectiveness of safety measures based on behavioral attitudes, is necessary to understand aspects of the spread of the disease and consequently contribute to overcoming a pandemic scenario.

The relaxation of the phases of the safety plan – which involved, among others, the reopening of businesses and the non-mandatory use of masks in open places – coincided with

the increase in COVID-19 cases in Porto Velho, in 2021, whose proportion was even higher than the indicators at the beginning of the pandemic in the capital of the state of Rondônia.

The development of research related to the population's reaction to preventive measures and the spread of fake news is necessary, especially in the face of an event with global dimensions, since the behavioral measures recommended by scientists, combined with vaccination, were and are essential for overcoming the pandemic.

It is also concluded that the highest rate of contamination by COVID-19 in Porto Velho, Rondônia, was concentrated in the population aged 30 to 49 years, mainly affecting females, and deaths in the age group 60 to 79 years old, mainly affecting males.

The methodological limitations of the research are those inherent to studies with an ecological approach, with the use of secondary data of variable precision and validity and which may be inadequate or incomplete. On the other hand, the interpretation of such data highlighted epidemiological aspects for understanding public policies in the city investigated, including historical-social developments linked to the pandemic.

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CONTRIBUTIONS
Brenda Custódio de Souza contributed to data collection and analysis and writing. **Iranira Geminiano de Melo** collaborated in the conception and writing. **Laura Borges Nogueira** participated in the writing. **Monnike Yasmin Rodrigues do Vale** worked on the design of the study.

How to cite this article (Vancouver)
Souza BC, Melo IG, Nogueira LB, Vale MYR. Deaths and confirmed cases of COVID-19 in a town in the Brazilian Amazon. Rev Fam, Ciclos Vida Saúde Contexto Soc. [Internet]. 2023 [cited in *insert day, month and year of access*]; 11(2):e6374. Available from: *insert access link*. DOI: *insert DOI link*.

How to cite this article (ABNT)
SOUZA, B. C.; MELO, I. G.; NOGUEIRA, L. B.; VALE, M. Y. R. Deaths and confirmed cases of COVID-19 in a town in the Brazilian Amazon. **Rev. Fam., Ciclos Vida Saúde Contexto Soc.**, Uberaba, MG, v. 11, n. 2, p. e6374, 2023. DOI: *insert DOI link*. Available from: *insert access link*. Access in: *insert day, month and year of access*.

How to cite this article (APA)
Souza, B.C., Melo, I.G.D, Nogueira, L.B., & Vale, M.Y.R. (2023). Deaths and confirmed cases of COVID-19 in a town in the Brazilian Amazon. Rev. Fam., Ciclos Vida Saúde Contexto Soc., 11(2). Retrieved in *insert day, month and year of access* from *insert access link*. DOI: *insert DOI link.*