Descriptive analysis in the COVID-19 database after one year of the pandemic disease in indigenous patients from the State of Acre

Adolfo Henrique dos Santos Fernandes
Instituto Federal do Acre
E-mail: adolfo.fernandes@ifac.edu.br;

Felipe dos Santos Lopes
Universidade Federal do Acre
E-mail: lopespge@gmail.com

RESUMO
Há pouco mais de um ano, foi confirmado o primeiro caso de coronavírus no Estado do Acre: em 15 de março de 2020. Desde então, a linha do tempo do coronavírus traz cada vez mais fatos importantes que mostram o tamanho do impacto da pandemia no estado. Neste artigo foram apresentados alguns gráficos estatísticos, como histogramas, gráficos de barras e boxplots, da amostra total e suas respectivas subamostras quando divididos por óbitos e casos recuperados. Após a breve análise descritiva das figuras apresentadas, podemos considerar algumas conclusões sobre a doença COVID-19 em pacientes indígenas no Estado do Acre.

Palavras-chave: Acre. Brasil. COVID-19. Indígenas. Pandemia Coronavírus.

ABSTRACT
Just over one year ago, the first case of coronavirus in the State of Acre was confirmed: on March 15, 2020. Since then, the coronavirus timeline has brought more and more important facts that show the size of the impact of the pandemic on the state. In this article, some statistical graphs were presented, such as histograms, bar graphs, and boxplots, of the total sample and their respective sub-samples when divided by deaths and recovered cases. After the brief descriptive analysis of the figures presented, we can consider some conclusions about the COVID-19 disease in indigenous patients in the State of Acre.

Keywords: Acre. Brazil. Coronavirus pandemic. COVID-19. Indigenous.

1 INTRODUCTION

Coronaviruses are common in many different animals, including camels, cattle, cats, and bats. Rarely, coronaviruses that infect animals can infect people, as an example of MERS-CoV and SARS-CoV. Recently, in December 2019, took place the transmission of a new coronavirus (SARS-CoV-2), which was identified in Wuhan in China and caused the COVID-19 to be disseminated, and then transmitted from person to person (CORONAVIRUS, 2021).

The COVID-19 is a disease caused by the coronavirus, called SARS-CoV-2, which presents a variable clinical spectrum, from asymptomatic infections to severe cases. According to the World Health Organization (WHO)[1], the majority (about 80%) of patients with COVID-19 can be asymptomatic or oligosymptomatic (few symptoms). Approximately 20% of the detected cases require hospital care because they have difficulty with respiratory disease, of which approximately 5% may require ventilatory support.

On March 11, 2020, the WHO classified the 2019 Coronavirus disease (COVID-19) as a pandemic. It means that the virus is circulating in all continents, and there is an occurrence of mildly symptomatic cases, making it challenging to identify. Thus, especially in the southern hemisphere, where Brazil is located, countries must prepare for autumn/winter to avoid increasing deaths (SESACRE, 2021).

Finally, Acre notified its first confirmed case of COVID-19 infection on March 15, 2020. From April 9, 2020, and beyond, the Health Surveillance Secretariat considered that in the cities where cases were registered, had already occurred confirmed of COVID-19 in the community or phase of sustained transmission, as it was not possible to establish an epidemiological link between the cases. Its indigenous population is 15,921, of which 2,595 are urban and 13,326 rural areas, where the ethnicities of the following *Alto and Baixo Acre* and *Juruá and Tarauacá/Envira* regions will be analyzed (SESACRE, 2021; IBGE, 2012):

- *Apurina (Aporina, Ipurina, Ipurinan);*
- *Arara Apolima;*
- *Arara do Acre (Shawanaua, Amawaka);*
- *Kaxinawa (Huni-Kuin, Cachinaua, Caxinaua);*
- *Kulina;*
- *Machineri (Manchineri, Manxineri);*
- *Yaminawa (Jaminawa, Iaminawa).*

2 METHODOLOGY

The used dataset was obtained on March 27 of 2021. It consisted of 1179 (one thousand, one hundred and seventy-nine) information regarding the notification of cases of COVID-19 in the State of Acre. They came from surveillance of Influenza Syndrome (SG) and Severe Acute Respiratory Syndrome (SRAG-HOSPITALIZADO) through the Acre State Transparency Portal website[2]: the Acre Without COVID-19 Pact, which is a management tool for health and socioeconomic crisis caused by the pandemic of COVID-19 in the State of Acre (SESACRE, 2020a; SESACRE, 2020b).

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[1] World Health Organization - https://www.who.int
[2] Government of the State of Acre - http://covid19.ac.gov.br

The dataset went through pre-processing steps that allowed us to choose which data items would be worked on, guaranteeing completeness, veracity, and integrity of the information, which allowed the reduction of the amount of data to group them by common characteristics.

After the pre-processing step, the information extracted from the dataset resulted in a total of 304 (three hundred and four) notifications, and we analyzed the following variables:

- **Age:** Discrete quantitative variable, refers to the patient's age;
- **Gender:** Nominal qualitative variable, indicates whether the patient's gender is Female or Male;
- **Comorbidities:** Nominal qualitative variable, these are the comorbidities presented by the patient, being Without for indigenous patients who did not have any health condition and With for indigenous patients who had at least one of these health conditions: Carrier of chromosomal diseases or fragile immune status, Chronic heart diseases, Chronic kidney diseases in advanced stage (3, 4 or 5 grades), Decompensated chronic respiratory diseases, Diabetes, Immunosuppression, Obesity, High-risk pregnant woman or Postpartum (up to 45 days after delivery);
- **Status:** Nominal qualitative variable, which is the classification of disease cases, where Recovered are the cases of indigenous patients referring to recovered and the Death are the cases of death.

3 RESULTS AND DISCUSSION

This section is about a descriptive analysis that presents the disease's performance in general. Figure 1 illustrates the histogram of age variable where we observe that the ages with the highest frequency are in the range [0, 10] and that the ages with the lowest frequency are in the range [90+], with 0 being the minimum age and 107 the maximum age of indigenous patients who tested positive for COVID-19.]

Figure 1. Histogram of Age
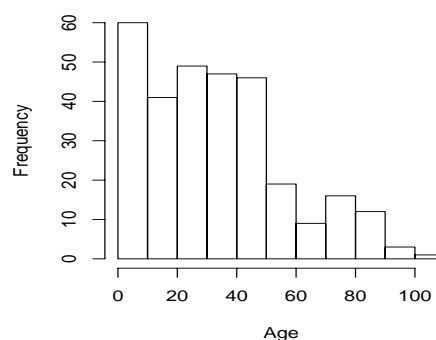
In Figure 2, the boxplots for the gender variable shows that most data are distributed between the ages of 30 and 50 years old for the female sex, approximately, having some outliers. While the majority of the data for the male sex are between the ages of 20 and 50, approximately, having no outliers.

Figure 2. Boxplots of Gender
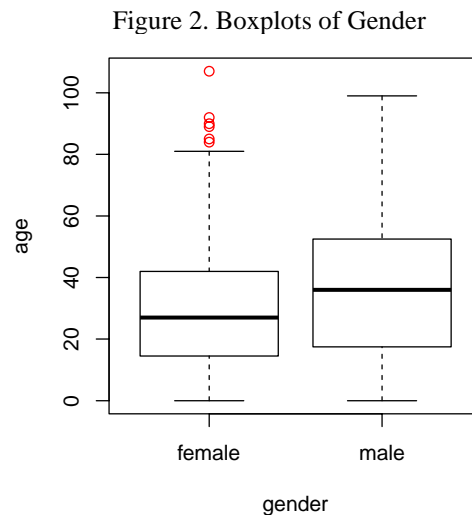
The barplots of Figure 3 serve to observe the distribution of the frequency of female and male indigenous patients with and without comorbidities (Figure 3a) and who of them died and recovered (Figure 3b). We noticed that there is a predominance of females over males in both characteristics in most of them. The only exception is the barplot of death characteristics which male is predominant.

Figure 3. Barplots of Gender by Comorbidities and by Status
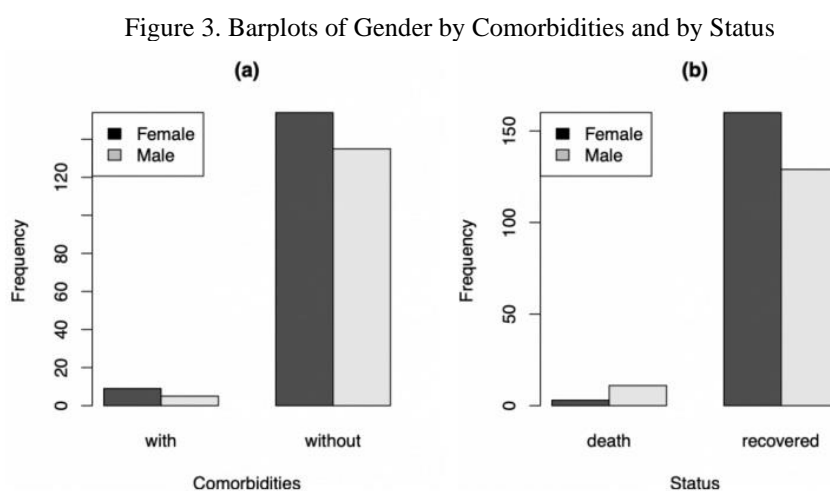
Now, in Figure 4a, we can see that in the boxplots of the comorbidity's variable, the majority of data from indigenous patients who presented comorbidities are between the ages of 20 and 60 years old, approximately, having no outliers. While most of the data from indigenous patients who did not present comorbidities are between the ages of 20 and 40, approximately, and counted 2 outliers.

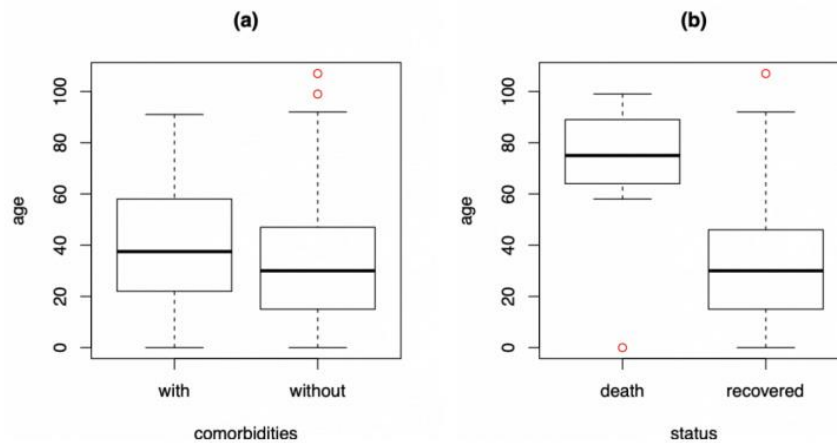Figure 4. Boxplots of Comorbidities and Status

Figure 4b also illustrates the respective boxplot's graphs for the status variable. Most indigenous patients who died are between ages 60 and 90 years old, approximately, and those indigenous patients counted 1 outlier. While the majority of the data from indigenous patients who recovered are between 20 and 40, approximately, and counted 1 outlier.

3.1 ABOUT COVID-19 DEATH CASES

This subsection is about a descriptive analysis that presents the disease's performance in death cases. Figure 5 illustrates the histogram of age variable where we observe that the ages with the highest frequency are in the range [80, 100+] and that the ages with the lowest frequency are in the range [20, 60], with 0 being the minimum age and 99 the maximum age of indigenous patients who died for COVID-19.

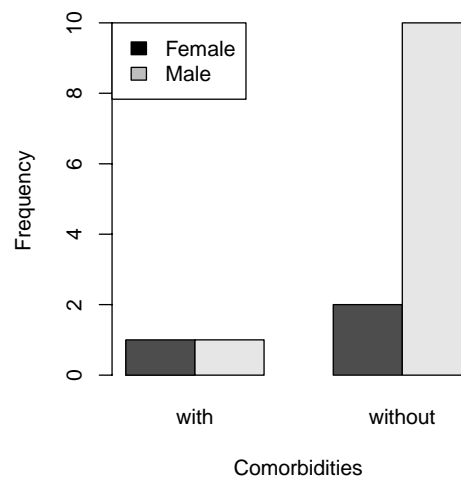Figure 5. Histogram of Age of death cases
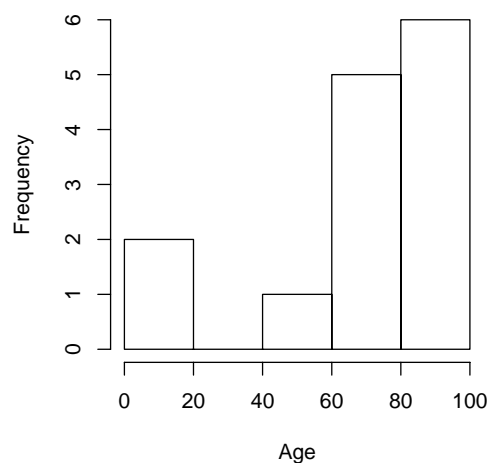
In Figure 6a, the boxplots for the gender variable shows that most data are distributed between the ages of 40 and 80 years old for the female sex, approximately, having no outliers. While the majority of the data for the male sex are between the ages of 70 and 80, approximately, having 1 outlier.

Figure 6. Boxplots of Gender and Comorbidities of death cases
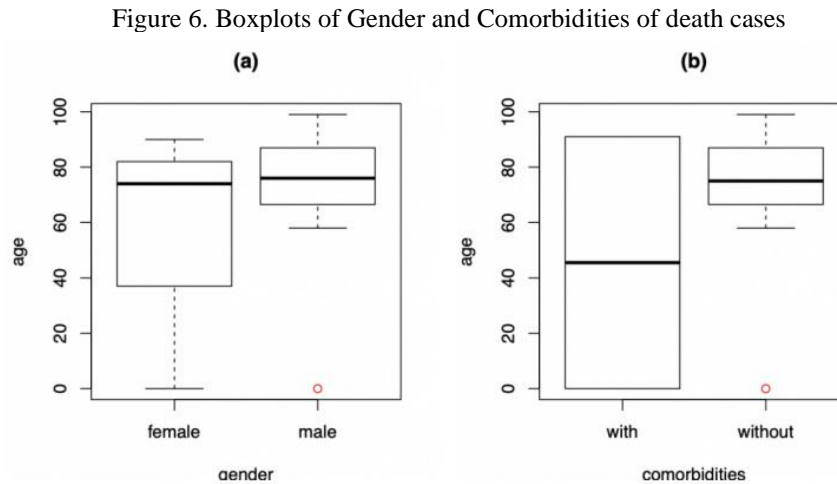
Also, in Figure 6b, we can see that in the boxplots of the comorbidity's variable, most data are distributed between the ages of 20 and 90 years old for both characteristics, approximately, having high variability and no outliers. While the majority of the data from indigenous patients who did not present comorbidities are between the ages of 70 and 90, approximately, and counted 1 outlier.

Finally, the barplots of Figure 7 serve to observe the distribution of the frequency of female and male indigenous patients who died with and without comorbidities, where it is possible to notice that the male sex was predominant in without characteristic and equal to the female sex in with characteristic.

Figure 7. Barplots of Gender by Comorbidities of death cases

3.2 ABOUT COVID-19 RECOVERED CASES

This subsection is about a descriptive analysis that presents the disease's performance in recovered cases. Figure 8 illustrates the histogram of age variable where we observe that the ages with the highest frequency are in the range [0, 10] and that the ages with the lowest frequency are in the range [90+], with 0 being the minimum age and 107 the maximum age of indigenous patients who recovered for COVID-19.

Figure 8. Histogram of Age of recovered cases
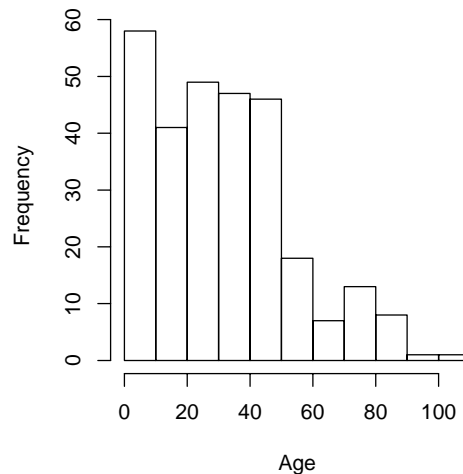
In Figure 9a, the boxplots for the gender variable shows that most data are distributed between the ages of 20 and 40 years old for both sexes, approximately, having some outliers in the female sex and none in the male sex

Figure 9. Boxplots of Gender and Comorbidities of recovered cases
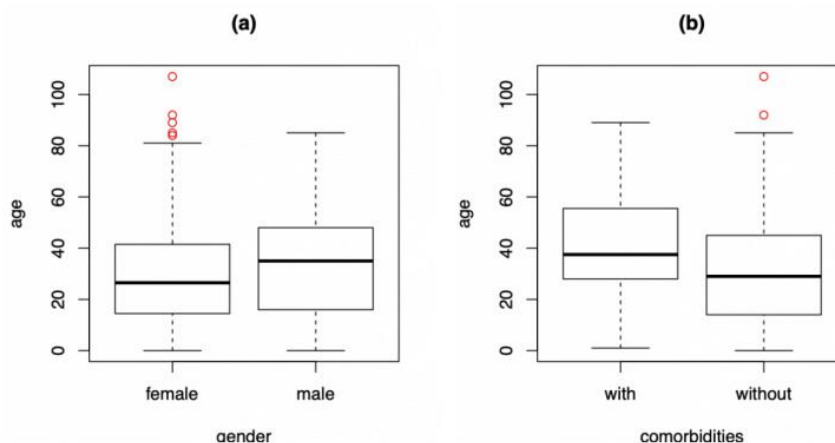
Also, in Figure 9b, we can see that in the boxplots of the comorbidity's variable, it shows that most data are from indigenous patients who presented comorbidities between the ages of 30 and 60 years old, approximately, and none of them had outliers. While most of the data from indigenous patients who did not present comorbidities are between the ages of 20 and 50, approximately, and counted 2 outliers.

Finally, the barplots of Figure 10 serve to observe the distribution of the frequency of female and male indigenous patients who recovered with and without comorbidities, where it is possible to notice that the female sex was predominant in both characteristics.

Figure 10. Barplots of Gender by Comorbidities of recovered cases
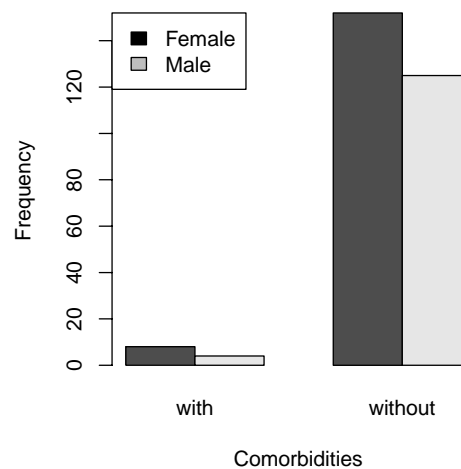
4 CONCLUSIONS

The visualization of the data utilizing these graphs: histogram, barplots, and boxplots, made it possible for us to do some conclusions. Starting with the histogram in Figure 1, we noticed that, in general, youngers and adults aged between 0-59 years old tested more favorable to the disease than senior (60+ years) people in both sexes. In previous Figure 3a, we notice that female indigenous patients tested more for comorbidities, with and without health conditions than males; in Figure 3b, more male indigenous patients died than females.

About death cases, Figure 5 shows a histogram which tells us that more senior indigenous patients died than younger and adult people, who of them died more without than with comorbidities. Furthermore, Figure 8 also shows a histogram telling us that youngers and adults indigenous patients recovered more from the disease than senior people about recovered cases.

Concerning the comorbidities of indigenous patients who died in Figure 7, it is possible to state that they do not contribute negatively to the patient's health status because among the analyzed ages, according to the boxplots in Figure 6 and 9, its influence is minimal.

In conclusion, about deaths, it can be seen that 73.33% (11 cases) occurred in indigenous patients over 60+ years old, 73.33% (11 cases) in male indigenous patients, and another public with a large share of deaths were indigenous patients without comorbidities representing 80.00% (12 cases) from a total population of 15 indigenous patients. Furthermore, about recovered cases, it can be seen that 58.48% (169 cases) occurred in adult indigenous patients, 55.36% (160 cases) were female indigenous patients and 95.85% (277 cases) without comorbidities from a total population of 289 indigenous patients until March 27 of 2021.

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