COVID-19 epidemic in Panama

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A R T I C L E   I N F O

A B S T R A C T

Objective: It is necessary to establish the evolution that the pandemic has had in Panama by weeks and months and to clearly establish the existence of surges or peaks, according to cases and deaths and the relationship with age groups.

Methodology: We conducted a retrospective cohort study of all confirmed COVID-19 cases reported by the Ministry of Health of Panama during the first 3 years of the epidemic (March 9, 2020, March 11, 2023). All cases were obtained from information provided by the Ministry of Health. We obtained daily information of the population at the national level reported as new cases, deaths, admission to hospitals, admission to intensive care units and by age groups. The information is classified by epidemiological week and by month from the diagnosis of the first case until March 2023.

Results: During the three years of the study, 1,032,316 cases of COVID-19 were registered in the Republic of Panama, and the number of deaths reported was 8,621, for a fatality rate of 0.83 % throughout that period. The number of deaths decreased over the 3 years of the pandemic; however, similar to the cases, there were periods of surges (peaks) per year in June/July and in December/January. The lethality progressively increased according to the age of the affected patients. During the first year, the lethality in those under 20 years of age was 0.05 %, and in those over 80 years old, it was 17.54 %. This pattern was maintained during the second year; however, there was a large decrease in all age groups.

Conclusion: the highest lethality rate in Panama occurred in the first year of the pandemic, with a great decrease in the third year; the impact of lethality is proportional to the age of the individual, with a high possibility of death in those over 80 years of age. During each pandemic year, there are two peaks (surges of new cases and deaths) per year, which are important times to take into account to generate strategies aimed at reducing the impact.

1. Introduction

Coronavirus disease 2019, the disease caused by the coronavirus named severe acute respiratory syndrome coronavirus 2 (SARS-

CoV-2), recognized by the name COVID-19, has had a devastating impact on the health and economy of the world in its early years [1, 2].

During this time, much research was done to identify COVID-19's epidemiology, clinical presentation pattern of organs damage, main causes of death, once effective vaccines against the virus became available, these were in turn studied for their potential side effects and their impact on disease trajectory. The frequency of new cases rate and mortality varies by country and by time of year, with curves known peaks of infection, or surges, used to visually describe the frequency pattern of new cases [3–8].

The annual evolution of new cases and deaths from COVID-19 has periodic peaks in the same country that do not necessarily coincide with other countries in the world. It is believed that environmental factors such as temperature, humidity, wind, and air quality can influence the behavior of the disease, that is, the seasonal influence and environmental or meteorological factors; however, the evidence is not conclusive [9–11]. All these factors can vary within a country, and for this reason, peaks of new cases and deaths are also observed in different periods in the same region [11].

In Latin America and the Caribbean, there are few publications on the epidemiological evolution, cases, and deaths including at least two years' worth of data, which limits our ability to make more precise analyses of the future evolution of this disease and its comparison with other regions. Some of the analyses made in Latin America include data from several countries that allow us to know important aspects, mainly on the number of cases and deaths [12,13].

It is necessary to determine the evolution that the pandemic had in Panama by epidemiological weeks and months and to clearly establish the existence of peaks or surges, according to the number of cases and deaths, as well as to ascertain their relationship with different age groups. In addition, it is necessary to observe if vaccination generated any significant changes in these data.

2. Methodology

Study design: We conducted a retrospective cohort study of all confirmed COVID-19 cases reported by the Ministry of Health of Panama during the first 3 years of the epidemic (March 9, 2020 to March 11, 2023). All cases were obtained from anonymized public data published by the Ministry of Health without any information that would allow the subjects to be identified. This protocol was approved by the Pacific Health Research Bioethics Committee (CBI # 87/2022).

Data collection: We obtained the information from the daily publications made by the Ministry of Health of Panama (https://www.minsa.gob.pa/destacado/coronavirus-covid-19), information that was provided and is maintained from the first case report to date. We obtained daily information on the population at the national level reported as new cases, deaths, hospital admissions intensive care unit admissions, and by age groups. The information is classified by epidemiological week and by month from the date of diagnosis of the first confirmed case of COVID-19 until March 2023.
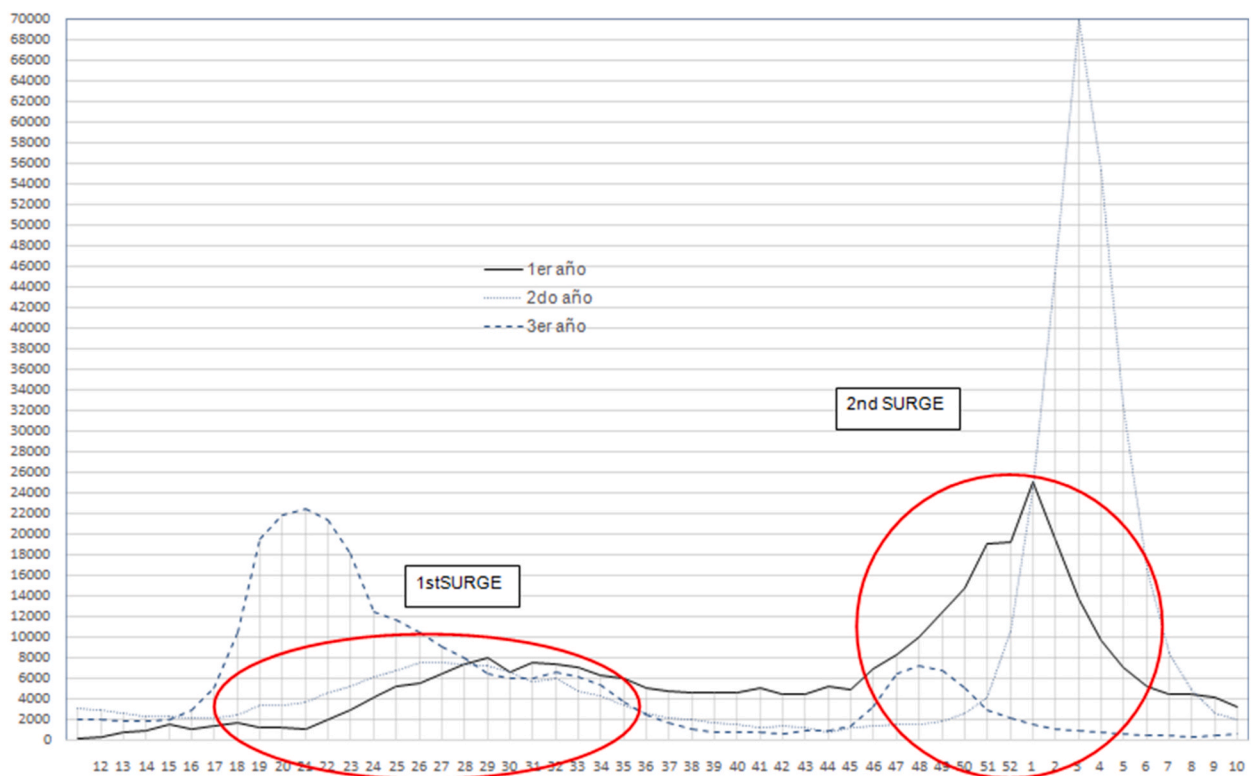

Fig. 1. Cases of COVID according to epidemiological week from 2020 to 2023 in Panama.

Statistical analysis: The sample represents the total number of diagnosed cases and deaths reported nationwide in the 3 years of the epidemic. A descriptive analysis is performed by epidemiological week, month, and year. Graphs were made that allowed the changes in the evolution of new cases and deaths per year to be observed, to identify the timing of waves or peaks that occurred per year. Lethality was analyzed by age group during the first two years of the epidemic in Panama. The data are presented as numbers and percentages by epidemiological week of the year.

3. Results

During the three years of the study, 1,032,316 cases of COVID-19 were registered in the Republic of Panama, and the number of deaths reported was 8,621, for a fatality rate of 0.83 % throughout that period. The highest number of deaths occurred in the first year of the epidemic in Panama; however, there were more cases of SARS-CoV-2 infections in the second year. The number of deaths decreased over the 3 years of the pandemic; however, similar to the number of cases, there were periods of peaks (surges) every year in June/July and in December/January, as shown in Figs. 1 and 2.

The number of cases diagnosed with COVID-19 in the first year was 346,018, and there were 5932 deaths, for a lethality rate of 1.71 %. In the second year, there were 413,301 cases and 2191 deaths, for a lethality rate of 0.53 %, which was 3.2 times less than that in the first year. During the third year of the epidemic, the number of diagnosed cases was 272,997, and there were 498 deaths, with a lethality rate of 0.18 %, 9.5 times lower than during the first year (Fig. 3).

The distribution of cases and deaths by age group was made by the Ministry of Health of Panama for a period of 2 years and 5 months; therefore, a comparison was made according to age group during the first two years, and the distribution by age group and cases is shown in Fig. 4. The lethality progressively increased according to the age of the affected patients. During the first year, the lethality in those under 20 years of age was 0.05 %, and in those over 80 years old, it was 17.54 %. This pattern was maintained during the second year; however, there was a large decrease in all age groups. In the second year of the epidemic, in the group under 20 years of age, the lethality rate was 0.02 % (2.5 times lower than the previous year), and the lethality rate was 8.37 % in those over 80 years of age, that is, 418 times higher than in those under 20 years of age but twice as low as in the first year of the epidemic (Fig. 5).

4. Discussion

Considering it is a new disease, SARS-CoV-2 infection had a devastating impact in Panama, especially in its first two years. During a period of 3 years, 1,032,316 cases were registered, and 8621 people died, generating a fatality rate of 0.83 %. The current population of Panama is 4.35 million [14]. Lethality fell from 1.71 % in the first year to 0.18 % in the third year, the vaccines were beginning to be used one month before the beginning of the second year, and a clear progression to a decrease in mortality has been observed since that time.

During these three years of the epidemic in Panama, it is very clearly observed that there have been two peaks or surges of new cases each year since the beginning of the pandemic. These peaks or surges appear first in June/July and then in December/January, with slight variation after the first year, possibly associated with the use of anti-COVID-19 vaccines. As expected, peaks of deaths are observed 3–5 weeks after the surge of cases. It is also observed that the first surge is longer and has fewer cases compared to the second surge, which has more cases but a shorter longevity. After these surges of COVID-19 cases and deaths, nadirs reaching their lowest levels occur each year during the months of September/October and March/April. This epidemiological evolution should help health authorities adopt preventive strategies to minimize the spread of the virus during times of surges of new cases. We do not know the cause or explanation of why this occurs in the country and in fact it should be a reason for future investigation. In addition, using
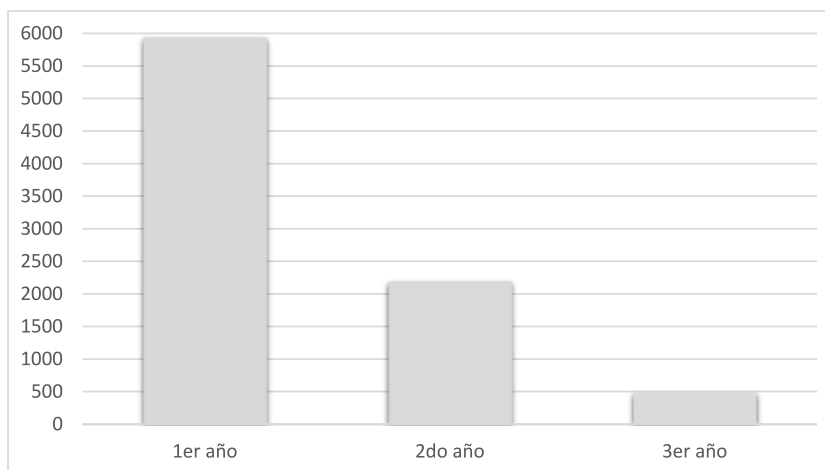

Fig. 2. Deaths during the 3 years of the pandemic - March 9, 2020 to 11 of March 2023
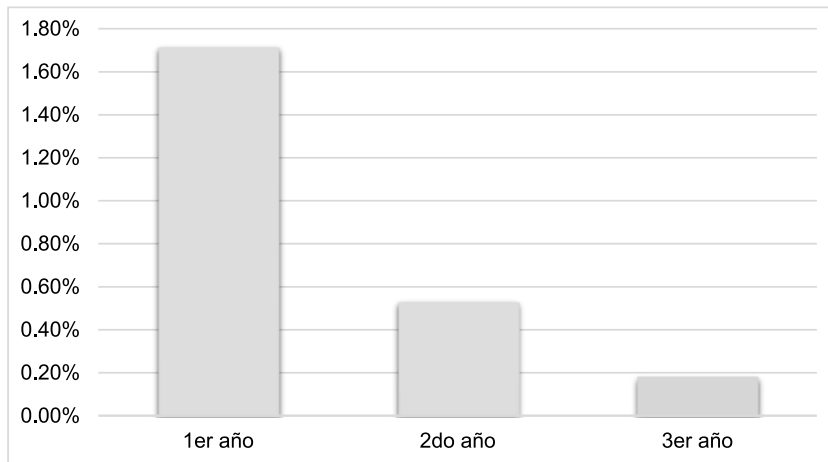Deaths 1st year = 5,932, 2 nd year = 2191 and 3rd year = 498.

Fig. 3. Lethality during the 3 years of the pandemic. March 9, 2020 to March 11, 2023 1st year lethality = 1.71 %, 2 nd year = 0.53 % and 3rd year = 0.18 %.
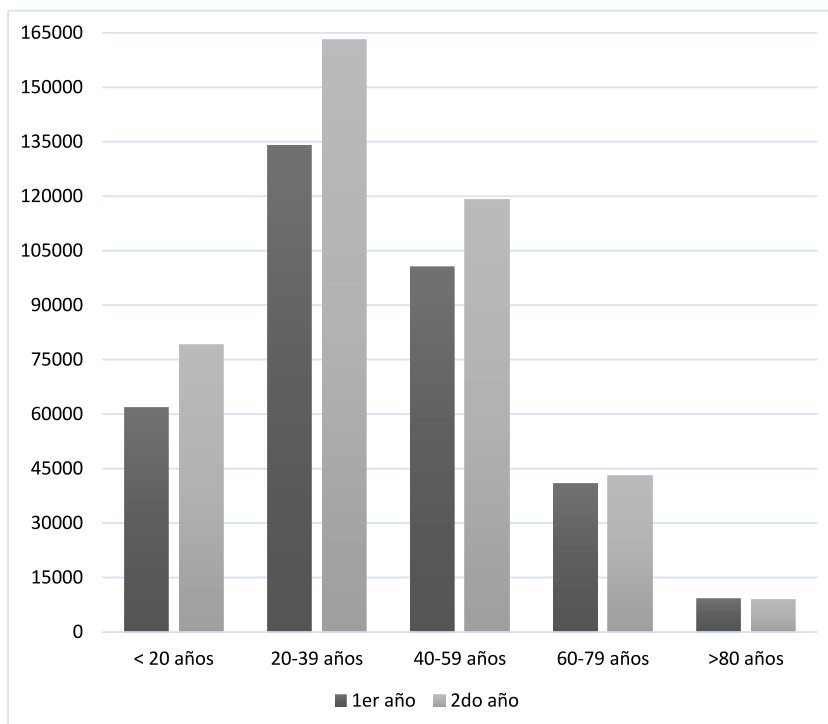

Fig. 4. Cases during the 1st and 2 nd year of the pandemic by age group in Panama.

clinical strategies that allow early identification of patients with higher risk would be recommended [15,16]. Among these strategies should be the massive use of vaccines in periods before the surges/peaks of new cases.

The number of deaths decreased considerably, from 5932 in the first year to 2191 in the second year, reaching 498 in the third year. This can be potentially explained by the use of vaccines against COVID-19, which began its massive application before the start of the second year of the pandemic, coupled with the existence of natural immunity acquired during the first year of the pandemic in a portion of the population.

The other relevant aspect observed with this research is the confirmation of the strong association between lethality and increasing age, with the chance of death increasing until reaching very high percentages in subjects past 60 years of age. During the first year, without natural or artificial immunity (vaccines), lethality in those under 20 years of age was 0.02 %, and in those over 60, it was 3.10 %; that is, the possibility of dying was 155 times higher in those over 60 years of age. The same behavior is observed in the second year, however, with percentages in each group that are less than half of what it was in the first year.
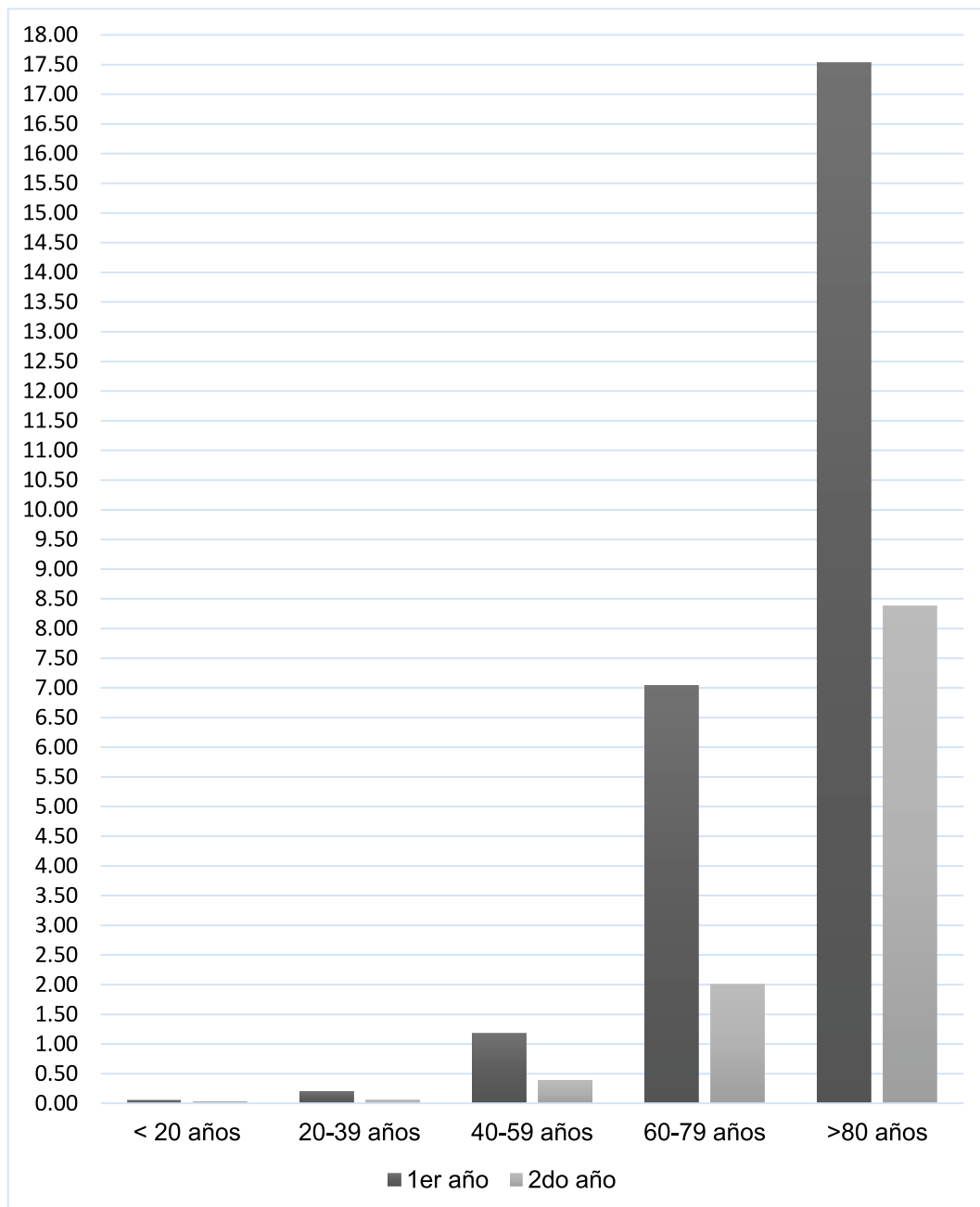
Fig. 5. Lethality during the 1st and 2 nd year of the pandemic by age group in Panama. 1st year lethality: <20 years = 0.05 %, 20–39 years = 0.20 %, 40–59 years = 1.18 %, 60–79 years = 7.03 %,> 80 years = 17.54 % 2 nd year lethality: <20 years = 0.02 %, 20–39 years = 0.06 %, 40–59 years = 0.39 %, 60–79 years = 2.00 %, >80 years = 8.37 %.

Panama, like other countries in the region, used different strategies to prevent and avoid the spread of SARS-CoV-2 infection [12, 15–17], including the closure of borders, travel restrictions, mandatory quarantine, use of masks, social distancing, selective closures and gradual reopening, increased hospital capacity, traceability, and mass vaccination campaigns. The comparison of cases and deaths between Panama and other countries in Latin America and especially Central America is not easy. Panama was one of the countries that reported the most cases, however it was the country that did the most tests. On the other hand, it was one of the countries with the greatest availability of vaccines against COVID-19 [18].

Among the strengths of our study is that the data was obtained from the population of the entire country and is also carried out based on the official national report for a period of 3 years. Also, the registry was updated daily and not per period.

Among the weaknesses is the lack of knowledge of how many cases were a first or second infection, in addition to how many died

from COVID-19 or with COVID-19. In addition, it was not possible to distinguish the deaths between vaccinated and unvaccinated individuals in the second and third years of the pandemic, a period in which vaccines were available to the public.

Conclusion: the highest lethality rate in Panama occurred in the first year of the pandemic, with a great decrease in the third year; the impact of lethality is proportional to the age of the individual, with a high possibility of death in those over 80 years of age. During each pandemic year, there are two peaks (surges of new cases and deaths) every year, which are important times to take into account to generate strategies aimed at reducing the spread of the disease.

Ethics approval and consent to participate

The approval of the authorities was obtained, and the principles of good clinical research practices were followed.

Consent for publication

Does not apply.

Data availability statement

Data will be made available on request to pvigild@hotmail.com, In addition, the information is available every day, without analyzing in https://www.minsa.gob.pa/destacado/coronavirus-covid-19.

CRediT authorship contribution statement

Paulino Vigil-De Gracia: Writing - review & editing, Writing - original draft, Methodology, Formal analysis, Conceptualization. **Ilan Delgado:** Writing - review & editing, Writing - original draft, Validation, Methodology, Formal analysis, Data curation. **Elias Saban:** Writing - review & editing, Writing - original draft, Methodology, Formal analysis, Data curation. **Pablo Vigil-Vargas:** Writing - review & editing, Writing - original draft, Methodology, Data curation, Conceptualization. **Roberto C. Cerrud-Rodríguez:** Writing - review & editing, Writing - original draft, Methodology, Investigation, Formal analysis, Conceptualization.

Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests:PAULINO VIGIL-DE GRACIA reports was provided by Social Security Fund, Panama. Paulino Vigil-De Gracia reports a relationship with Social Security Fund, Panama that includes: employment. If there are other authors, they declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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No.

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