EPH159

Burden of COVID-19 and its associated clinical characteristics in Colombia: a retrospective database analysis.

Authors: Jair Arciniegas[1], Juan Manuel Reyes[1], Jhon Bolaños-López[2], Carlos Mendoza[3], Julia Regazzini Spinardi[3], Jingyan Yang[3], Farzaneh Maleki[3], Farley Johanna Gonzalez[2], Carlos Bello[2], Ana Catalina Herrera[2], Omar Escobar[1], Monica Garcia[1], Andrea Constanza Rubio[1], Luz Eugenia Pérez Jaramillo[2], Jorge La Rotta[1], Moe Hein Kyaw[3].

[1]Pfizer, Colombia. [2]Biociencias – Sura, Colombia. [3]Pfizer, USA.

BACKGROUND

The COVID-19 pandemic has imposed unprecedented clinical burden to healthcare services and socioeconomic burden to societies worldwide. To develop effective prevention and treatment strategies, it is important to gather information about patients' clinical and demographical characteristics, although this has been analyzed in multiple studies, such data are found to a lesser extent in Latin American countries[1-3], and specifically in Colombia.

OBJECTIVE

- This study aimed to estimate the burden of COVID-19 infections and understand its demographic and clinical characteristics of patients in one of the largest Health Maintenance Organization (HMO) -Sura- in Colombia.

METHODS

- A retrospective database study in patients diagnosed with COVID-19 who received medical care in inpatient and outpatient at the Health Maintenance Organization (HMO) -Sura- in Colombia between March 2020, and January 2023 was conducted.
- The diagnosis of COVID-19 was defined as documented records of COVID-19 related ICD codes (U07.1 or U07.2) and confirmation of COVID-19 infection with PCR. Disease severity was defined based on the outpatient and inpatient services utilization. For outpatients as mild cases managed at home through telemedicine or telephone consultations, who do not require oxygen therapy and moderate, cases treated on an outpatient basis or at home with oxygen therapy. For inpatients (severe cases) are treated in the hospital setting without admission to the intensive care units (ICU) and critical cases patients treated in the ICU setting at some point during the observation period.
- Based on guidelines provided by the Centers for Disease Control and Prevention (CDC)[4], The risk factors for severe COVID-19 include adults ≥65 years of age, history of cancer, CKD, chronic lung disease, dementia or other neurological conditions, type 1 or type 2 diabetes, Down syndrome, CVD, HIV infection, hypertension, immune deficiencies/immunocompromised state, liver disease, obesity, SCD or thalassemia, current or past smoking, solid organ or hematopoietic[4]. The reinfection period was defined as new COVID-19 event confirmed by ICD-10 after 90 days of the initial infection[5].
- The data analysis of this study focused on the production of descriptive statistics, where frequencies, percentages, measures of centrality (such as median) and dispersion (Interquartile Range, IQR) were calculated. The incidence rate was calculated as [(new cases/population) X 100,000]. Similar approach was used for the calculation of mortality rate. Statistical analysis was performed using R statistical language (v. 4.3.1), the main packages were tidyverse and epiR[6-8].

RESULTS

- 1,030,037 positive confirmed cases of COVID-19 were observed in the study period. The cases were from females (55.4%) and predominantly lived in urban areas (99%). The median age was 38 years (range: 0-112 years, IQR; 22) (Table 1).
- Of the 1,030,037 cases, 79.2% were mild, 0.8% were moderate, 19.2% were severe and 0.9% were critical. About 94% of mild (n= 771,913) and moderate cases (n= 6,873) were not vaccinated against COVID-19 and over 96% in the severe (n= 190,093) and critical cases (n= 8,593) (Table 1).
- The most common comorbidities were related to immunocompromised state (22.8%), hypertension (17.7%), mental health conditions (15.3%), cancer (10.6%) and obesity (10.4%). As for cases with any risk factors for severe COVID-19 (such as age -65 years and older- and some comorbidity like diabetes, cancer, immunocompromised state among others), 5.5% were mild, 17.6% moderate, 18.9% severe and 36.7% critical (Table 1).
- Subgroup analyses showed that milder cases tend to be younger (median: 36 IQR: 19), while critical cases were older (median: 59, IQR:21), and although most patients were females, for critical cases this behavior reverses, only 35.2% of them had this feature (Table 1).
- In addition, these results suggest that severe cases distributed in an inequal manner, considering that critical cases concentrated in a higher proportion on cases with lower income, especially these figures were higher for those with monthly salaries under 2 legal minimum wages (mild 60.2% vs. critical 70.2%) (Table 1).
- On the other hand, the most present comorbidities – such as hypertension, mental health conditions and immunocompromised state- were more relevant for severe and critical cases, and likewise the proportion of patients with high risk factors for severe COVID-19 were higher on those cases.

RESULTS (cont)

Table 1. Clinical and demographical characteristics of COVID-19 cases during March 2020, and January 2023

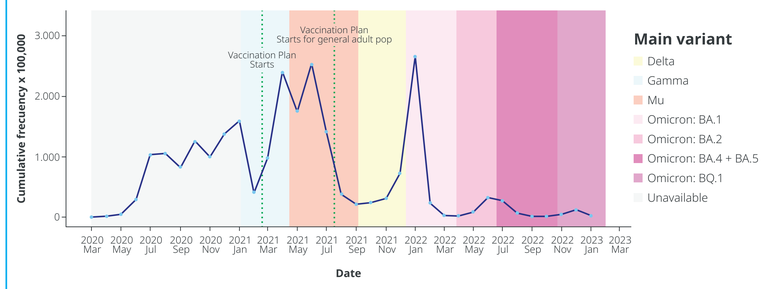
	Total 1,030,037	Mild 815,936	Moderate 7,804	Severe 197,348	Critical 8,949
Demographic data					
Age, median years (IQR)	38 (22)	36 (19)	42 (28)	48 (26)	59 (21)
Age groups, n (%)					
5 years or under	19,148 (1.9)	17,075 (2.1)	412 (5.3)	1,593 (0.8)	68 (0.8)
>5 to 10 years	20,780 (2)	18,818 (2.3)	119 (1.5)	1,826 (0.9)	17 (0.2)
>10 to under 18 years	36,448 (3.5)	33,635 (4.1)	121 (1.6)	2,669 (1.4)	23 (0.3)
18 to 49 years	678,559 (65.9)	574,174 (70.4)	4,226 (54.2)	97,769 (49.5)	2,390 (26.7)
50 to 65 years	196,367 (19.1)	131,624 (16.1)	1,634 (20.9)	59,726 (30.3)	3,383 (37.8)
Over 65 years	78,735 (7.6)	40,610 (5)	1,292 (16.6)	33,765 (17.1)	3,068 (34.3)
Female, n (%)	570,911 (55.4)	457,911 (56.1)	4,337 (55.6)	105,512 (53.5)	3,151 (35.2)
Urban residents, n (%)	1,024,009 (99.4)	810,647 (99.4)	7,771 (99.6)	196,719 (99.7)	8,872 (99.1)
Contributor income*, n (%)					
Less than 2 legal minimum wages	633,184 (61.5)	491,226 (60.2)	5,180 (66.4)	130,494 (66.1)	6,284 (70.2)
Between 2 and 5 legal minimum wages	237,223 (23)	190,681 (23.4)	1,583 (20.3)	43,300 (21.9)	1,659 (18.5)
More than 5 legal minimum wages	97,181 (9.4)	83,986 (10.3)	438 (5.6)	12,287 (6.2)	470 (5.3)
Missing	62,449 (6.1)	50,043 (6.1)	603 (7.7)	11,267 (5.7)	536 (6)
Clinical data					
Weight, median kg (IQR)	69 (22)	67 (21)	70 (21.5)	74 (22)	77 (23)
Height, median cm (IQR)	162 (15)	162 (16)	161 (15)	163 (15)	163 (16)
Pregnant, n (%)	5,248 (0.5)	3,683 (0.5)	78 (1)	1,466 (0.7)	21 (0.2)
Number of comorbidities, median (IQR)	0 (2)	0 (1)	1 (2)	1 (3)	2 (2)
Comorbidities, n (%)					
Immunocompromised state	234,700 (22.8)	167,315 (20.5)	2,321 (29.7)	62,526 (31.7)	2,538 (28.4)
Hypertension	182,288 (17.7)	104,137 (12.8)	2,233 (28.6)	71,586 (36.3)	4,332 (48.4)
Mental Health Conditions	157,773 (15.3)	116,793 (14.3)	1,610 (20.6)	37,768 (19.1)	1,602 (17.9)
Cancer	108,976 (10.6)	77,253 (9.5)	997 (12.8)	29,692 (15)	1,034 (11.6)
Obesity	107,378 (10.4)	69,754 (8.5)	985 (12.6)	35,207 (17.8)	1,432 (16)
Chronic lung disease	81,350 (7.9)	46,699 (5.7)	1,204 (15.4)	30,798 (15.6)	2,649 (29.6)
Diabetes	59,978 (5.8)	30,297 (3.7)	849 (10.9)	26,662 (13.5)	2,170 (24.2)
Cardiac Conditions	22,017 (2.1)	11,236 (1.4)	391 (5)	9,763 (4.9)	627 (7)
Chronic Kidney Disease	21,067 (2)	10,592 (1.3)	303 (3.9)	9,314 (4.7)	858 (9.6)
Peripheral vascular disease	17,991 (1.7)	11,236 (1.4)	231 (3)	6,167 (3.1)	357 (4)
Chronic Liver Disease	13,370 (1.3)	8,748 (1.1)	135 (1.7)	4,310 (2.2)	177 (2)
Cerebrovascular accident	8,233 (0.8)	4,553 (0.6)	138 (1.8)	3,345 (1.7)	197 (2.2)
Drug use disorder	7,249 (0.7)	5,588 (0.7)	63 (0.8)	1,544 (0.8)	54 (0.6)
HIV/AIDS	6,733 (0.7)	4,362 (0.5)	106 (1.4)	2,202 (1.1)	63 (0.7)
Dementia–Neurological Conditions	6,284 (0.6)	3,148 (0.4)	154 (2)	2,879 (1.5)	103 (1.2)
Tuberculosis	3,318 (0.3)	2,239 (0.3)	68 (0.9)	926 (0.5)	85 (0.9)
Transient ischemic attack	2,765 (0.3)	1,665 (0.2)	43 (0.6)	1,016 (0.5)	41 (0.5)
Organ Transplantation	1,995 (0.2)	1,038 (0.1)	34 (0.4)	808 (0.4)	115 (1.3)
Sickle cell disease	554 (0.1)	435 (0.1)	4 (0.1)	108 (0.1)	7 (0.1)
Down Syndrome	308 (0)	229 (0)	6 (0.1)	58 (0)	15 (0.2)
Risk Factors for Severe COVID-19, n (%)	86,990 (8.4)	45,096 (5.5)	1,376 (17.6)	37,237 (18.9)	3,281 (36.7)
Reinfected, n (%)	56,489 (5.5)	42,917 (5.3)	351 (4.5)	13,062 (6.6)	159 (1.8)
Vaccination status					
Unvaccinated	977,472 (94.9)	771,913 (94.6)	6,873 (88.1)	190,093 (96.3)	8,593 (96)
Partial	18,338 (1.8)	13,809 (1.7)	248 (3.2)	4,079 (2.1)	202 (2.3)
Fully vaccinated	33,309 (3.2)	29,389 (3.6)	652 (8.4)	3,117 (1.6)	151 (1.7)
Fully vaccinated + any booster	918 (0.1)	825 (0.1)	31 (0.4)	59 (0)	3 (0)

*For 2022 a minimum legal wage was 235 USD.

RESULTS (cont)

- The monthly COVID-19 cumulative cases shows a multimodal behavior, , with several peaks, considering the highest peaks were observed after the Colombian vaccination plan started[9] on February 17, 2021 and even after when it opened for all adults on July 17, 2021.
- The highest peaks were present on January 2022 (Omicron variant dominated), June 2021 (Mu variant dominated) and April 2021 (Gamma variant dominated), when they reached 2,658.5 cases per 100,000 persons (Confidence Interval [CI] 95%: 2,643.6 - 2,673.5), 2,543.1 (CI95% 2,528.0 - 2,558.2) and 2,406.1 (CI95% 2,391.3 -2,420.9), respectively.
- However as shown in the Figure 1, this frequency trended downwards once the peak in early 2022 was reached. This general behavior its similar to the one observed on other sources, where the highest peak was in January 2022[10,11].

Figure 1. Monthly COVID-19 cumulative cases, March 2020- January 2023



Note: the vaccination plan began on February 17, 2021, with prioritized populations, such as health care workers, and later on July 17 of the same year it was opened to all adults.

- Analogous to the trend observed in the cumulative frequency, the estimated annual crude mortality rate, in 2020 it was 58.02 per 100,000 persons (CI95% 55.72 - 60.34) reached its highest peak in 2021 (gamma, mu and delta variant dominated) with 130.77 (CI95% 127.49 - 134.07) and decreased to 18.37 per 100,000 persons (CI 95% 17.20 - 19.55) in 2022 (Omicron variant dominated). Likewise, the annual case fatality rate was 0.88% (CI95% 0.85% - 0.92%) in 2020, then increased to 1.08% (CI95% 1.05% - 1.11%) in 2021 and finally decreased to 0.50% (CI95% 0.47% - 0.53%) in 2022.

CONCLUSION

Our study showed that women, middle aged and older adults, and urban residents were more likely to be infected with COVID. Unvaccinated, elderly and people with immunosuppression were at increased risk of severe COVID-19 infection. The incidence and mortality rates varied substantially depending on waves of COVID variant.

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Financial disclosure: This study was sponsored by Pfizer S.A.S. Poster presented in ISPOR International, Atlanta May 5-8 2024.