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Comparative analysis of sociodemographic, clinical, and laboratory parameters between the first and second wave of COVID-19

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Abstract

Background: After the breakout of the COVID-19 pandemic in 2019, the first wave of COVID-19 in India was observed in 2020, and the second wave was observed in 2021. India is now on the brink of the upcoming third wave of COVID-19 in 2022.

Objective: In the present study, we analyze the sociodemographic, clinical, and laboratory parameters between the first and second waves of COVID-19 to generate insight into better management of hospital resources during the third wave of COVID-19.

Methods: We studied the data of 200 COVID-19-positive patients, from which 100 patients belonged to the first wave of COVID-19 and another 100 patients belonged to the second wave of COVID-19. Comparative analysis of sociodemographic determinants, clinical parameters and common laboratory markers was conducted between the first and second waves of COVID-19.

Results: The mean age and sex of patients in the first and second waves of COVID-19 do not exhibit any significant difference; however, a greater proportion of males was found in both waves compared to females. An almost equal number of patients presented complaints of fever, cough and dyspnea in the first and second waves of COVID-19. However, laboratory markers exhibited a significant difference between the two COVID-19 waves.

Conclusion: Present study will provide important insight into changing paradigms from the first to the second wave of COVID-19, which will help in the management of patients in the upcoming third wave of COVID-19.

Keywords: D-Dimer, COVID-19, hospital stay, ferritin, pandemic

Introduction

Although the first COVID-19 case in India was reported in January 2020, the initial wave of infection took more than a year to finish. India had fewer daily confirmed cases per million people throughout the lengthy first wave than many other nations; however, the situation began to change in March 2021 with the sharp increase in COVID-19-positive cases in the whole nation [1, 2]. According to data from the repository "ourworldindata," which compares the number of COVID-19-positive cases per day for India and the rest of the world, the first wave in India began in March 2020, peaked in September 2020 with more than 90,000 confirmed cases per day, and then gradually subsided with 10,000 confirmed cases per day in February 2021. A few nations, notably India, experienced the first wave of COVID-19 before August 2020. The second and third waves, which are still occurring now, began in August, September 2020, and March 2021, respectively [3, 4]. In India, the third coronavirus wave is moving through the country gradually. As of April 23, 2021, there were 15.9 million COVID-19 cases and 1,85,000 fatalities [5].

Compared to the first wave, the second wave has developed at a spectacular rate. Several variables may cause the increasing number of cases in the second wave. It has been noted that the mutant virus has a more robust potential for transmission and a shorter incubation time. The public has now mostly disregarded the "Covid Appropriate Behaviours (CAB)" and the caliber of masks used varies greatly.

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Due to their higher price tag, N-95 masks are not very popular in India, where the bulk of the population prefers to use either locally produced clothing-based masks or the same, worn-out masks again. The increased testing can also be blamed for the significant increase; however, questions have been raised regarding the validity of the testing after it was shown that numerous cases with positive Covid-19 symptoms resulted in negative RT-PCR results [5].

According to some reports, various variables may have contributed to the increase in India's reproduction rate (R0). Resources and labor will run out if the number of COVID-19 cases increase daily at the current astounding rate. For COVID-19 patients across the nation, there is a severe lack of hospital beds, oxygen supplies, medications, and ventilators. The total number of deaths is surprisingly large, even if there isn't a discernible percentage rise in the mortality rate in the second wave due to an alarmingly high number of infections. Therefore, it is vital to create hospitals that may save thousands of lives in a quick yet timely manner. Since there is no apparent end to this catastrophe in the foreseeable future, the populace must learn to live with it safely and carefully. It is obvious that prevention is preferable to treatment for this illness, so all feasible precautions must be taken, including public involvement and participation in disease control, strict implementation of COVID Appropriate Behaviors (i.e., social withdrawal, use of face masks, and hand sanitation), mini lockdowns, night curfews, micro containments, etc. [5].

The first and second waves differ in several ways. The present article aims to analyze the difference in the sociodemographic, clinical and common laboratory markers between the first and second waves of COVID-19. The present study will provide important insight into changing paradigms from the first to the second wave of COVID-19, which will help in the management of patients in the upcoming third wave of COVID-19.

Material and Methods

It was a retrospective study of 200 patients admitted to the host institute with Covid, with 100 subjects from August 2020 to December 2020 in the first wave of covid and 100 subjects from March 2021 to July 2021 in the second wave of covid. Patients in the vicinity of the host institute over 18 years of age and of either sex were included in this retrospective research. According to the WHO interim recommendations, a real-time RT-PCR assay was used to confirm the diagnosis in all cases using samples from nasal and pharyngeal swabs [6]. Patients admitted and positive for Covid by RT-PCR who were symptomatic or asymptomatic were included in the study, whereas immunocompromised patients were excluded from the study.

Data collection: A standardized case report form was employed to retrieve medical information. Electronic medical records were used to extract the data. We gathered data on sociodemographic determinates, including age and sex. Clinical parameters include fever, cough, dyspnea, and oxygen saturation. We obtained laboratory markers data, including C-reactive protein (CRP), D-dimer, lactate dehydrogenase (LDH), serum ferritin, and total leukocyte count (TLC).

Statistical analysis: Mean and standard deviation were used to analyze the quantitative variable. Qualitative variables are represented as a fraction of the total or percentages. An unpaired t-test was used to compare two means, and a chi-square was used to analyze categorical data. Data are represented as tables.

Results

The mean age of the patients in the first COVID-19 wave was 50.52 ± 17.94 years, and in the second wave was 54.27 ± 13.88 years with no significant difference (p=0.102). The number of males and females in the first COVID-19 wave was 65 and 35, respectively and in the second wave was 63 and 37, respectively, with no significant difference (0.883). During the first wave of COVID-19, fever was encountered in 57 patients, the cough was reported in 59 patients and dyspnea was observed in 58 patients. In the second COVID-19 wave, fever was encountered in 60 patients, cough was reported in 56 patients, and dyspnea was observed in 66 patients. There was no significant difference in terms of fever (p=0.774), cough (p=0.774), and dyspnea (p=0.307) in the first and second waves of COVID-19. In the first COVID-19 wave, oxygen saturation was normal (≥95%) in 49 patients and below normal (<95%) in 51 patients. In the second COVID-19 wave, oxygen saturation was normal (≥95%) in 41 patients and below normal (<95%) in 59 patients. No significant difference (0.319) was observed in the oxygen saturation between the first and second waves of COVID-19 (Table 1).

Table 1: Sociodemographic determinants and clinical parameters of COVID-19 patients during the first and second wave of COVID-19

Variable	Subdomain	First Wave	Second Wave	P value
Age		50.52 ± 17.94 years	54.27 ± 13.88 years	0.102
Gender	Male	65	63	0.883
	Female	35	37	

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Symptoms	Fever	57	60	0.774
	Cough	59	56	0.774
	Dyspnea	58	66	0.307
O_2 Saturation	Normal (≥95%)	49	41	0.319
	Below (<95%)	51	59	

The TLC was 8630 ± 3205 and 8621 ± 4666 in the first and second waves in COVID-19 with no significant difference (p=0.988). The D-dimer was significantly high (p=0.038*) in the first wave (2779 ± 1775) of COVID-19 compared to the second wave (1785 ± 1619). The LDH level was significantly high (p=0.019*) in the first wave (812.0 ± 346.3) of COVID-19 compared to the second wave (505.9 ± 313.0). The LDH level was significantly high (p=0.019*) in the first wave (812.0 ± 346.3) of COVID-19 compared to the second wave (505.9 ± 313.0). Serum ferritin was significantly high (p=0.022*) in the second wave (667.2 ± 274.0) of COVID-19 compared to the first wave (86.46 ± 148.3). The C-reactive protein was positive in 35 and 40 patients during the first and second waves of COVID-19 respectively, with no significant difference (Table 2).

Table 2: Laboratory markers of COVID-19 patients during the first and second wave of COVID-19

Variable	First Wave	Second Wave	P value
TLC	8630 ± 3205	8621 ± 4666	0.988
D-Dimer	2779 ± 1775	1785 ± 1619	0.038*
LDH	812.0 ± 346.3	505.9 ± 313.0	0.019*
Serum Ferritin	86.46 ± 148.3	667.2 ± 274.0	0.022*
C-Reactive protein (+)	35	40	0.559

Discussion

According to a recent investigation, the age categories of 11 to 30 years, 31 to 45 years, and 46 to 60 years were the most afflicted in both the first and second COVID-19 waves, followed by the age groups of 61 to 80 years, 81 to 100 years and 1 to 10 years. According to a comparison study, the demographic most impacted was between the ages of 11 and 30 in North America and Oceania and between the ages of 31 and 45 in Africa and Asia. Three age groups, namely those between the ages of 11 and 30, 31 to 45, and 46 to 60, proved similarly susceptible in both infection periods, albeit in Europe. Surprisingly, in South America, the age group with the most impact during the first wave was the 31-45-year-olds (31.23%), whereas, during the next two months, the 11-30-year-olds had the greatest impact (29.73 percent). Similarly, in India, during the first wave of COVID-19, the age groups with the highest infection rates were 11-30 years (30.01%) and 31-45 years (30.48%), respectively. However, during the second wave, those age groups increased to 31-45 years (32.03%) and 46-60 years (30.47%) [7]. In the present study, the mean age of the patient in the first COVID-19 wave was 50.52 ± 17.94 years, and in the second wave was 54.27 ± 13.88 years. Another study from India showed that in the 2nd wave, a higher number of pediatric and younger individuals are getting infected, in addition to older ones which is contradictory to the finding of our study [1]. Tendulkar *et al*. also reported that the mean age of the patients was 55 ± 16.24 years in the first wave, while in the second wave, the mean age was 56.81 ± 14.92 years, with no significant difference [8].

India and the rest of Asia registered a higher number of male than female patients in both COVID-19 first wave (male patients: Asia, 61.4%, India, 64.9%) and second wave (male patients: Asia, 59.54%, India, 71.09%) [7]. In the current study, the number of males and females in the first COVID-19 wave was 65 and 35, respectively and in the second wave was 63 and 37, respectively, which is consistent with the previous studies mentioning a higher proportion of male patients.

In a recent Indian study, the oxygen saturation was higher in the second COVID wave, which is not the case in the present study [1]. In the present study, oxygen saturation was normal (≥95%) in 49 patients in the first wave and 41 patients in the second wave of COVID-19; however, the difference was not statistically significant.

Dyspnea in both COVID-19 waves was the most prevalent clinical symptom among the deceased in the study by Tendulkar *et al*., followed by fever and cough [8]. However, in our research, an almost equal number of patients presented with the complaint of fever, cough and dyspnea in the first and second waves of COVID-19. Clinical symptoms have linked dyspnea to increased COVID-19-related mortality [9]. In one of the Iranian investigations comparing clinical symptoms in the first and second waves, it was shown that second wave symptoms such as fever, diarrhea, loss of taste and smell, and stomach discomfort were more prevalent [10].

It has been discovered that a higher CRP level is linked to a higher composite negative outcome. Elevated CRP was linked to a higher likelihood of developing severe COVID-19 infection and requiring ICU care, but not death [11]. The present study found a higher number of elevated CRP cases during the second COVID-19 wave. Besides CRP, elevated D-dimer was associated with an increase in poor composite outcomes. It was demonstrated that a high D-dimer was linked to higher mortality and severe COVID-19 but not to the requirement for intensive care [11]. In our study, the D-dimer level was

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significantly higher during the first wave compared to the second wave of COVID-19. Patients with a poor composite outcome had a higher ferritin level and it was demonstrated that ferritin level was higher in non-survivors and patients with severe COVID-19 [11]. In the current study, serum ferritin was significantly increased compared to the first wave of COVID-19.

As a strength, the present study is among a few studies highlighting the changing paradigms from the first wave to the second wave of COVID-19. We performed a comparative analysis of sociodemographic, clinical, and laboratory parameters during the first and second waves of COVID-19. As a limitation, we can analyze only a few parameters, and more parameters need to be compared to create a forecasting model for the third wave. Also, the present study is performed by using the data from a single tertiary care institute which may influence the generalization of finding for the whole population. A multicentric database needs to be created for the various parameters of COVID-19-related data to obtain generalized results.

Conclusion

The study only involved one facility; however, the results were consistent with most systemic reviews and meta-analyses. Surprisingly, very few studies have examined the patient baseline characteristics between the first and second COVID-19 waves. There is not much research conducted in India either. The study had shown that most of the sociodemographic and clinical parameters do not exhibit a significant difference between the first and second waves of COVID-19. At the same time, laboratory markers demonstrated a substantial difference between two COVID-19 waves. This can be one of the possible scientific explanations for the high mortality observed during the second wave in India.

References

1. Andrews M, Areekal B, Rajesh K, Krishnan J, Suryakala R, Krishnan B, *et al*. First confirmed case of COVID-19 infection in India: A case report. The Indian journal of medical research. 2020;151(5):490.
2. Goyal AK, Bakshi J, Panda NK, Kapoor R, Vir D, Kumar K, *et al*. Stigmatic impact of COVID-19 pandemic on head & neck cancers survivors. Indian Journal of Otolaryngology and Head & Neck Surgery, 2021, 1-5.
3. Seong H, Hyun HJ, Yun JG, Noh JY, Cheong HJ, Kim WJ, *et al*. Comparison of the second and third waves of the COVID-19 pandemic in South Korea: Importance of early public health intervention. International Journal of Infectious Diseases. 2021;104:742-5.
4. Taboada M, González M, Alvarez A, Eiras M, Costa J, Álvarez J, *et al*. First, second and third wave of COVID-19. What have we changed in the ICU management of these patients? Journal of Infection. 2021;82(6):e14-e5.
5. Jain VK, Iyengar KP, Vaishya R. Differences between First wave and Second wave of COVID-19 in India. Diabetes & metabolic syndrome. 2021;15(3):10-47.
6. Organization WH. Clinical management of severe acute respiratory infection when novel coronavirus (nCoV) infection is suspected: interim guidance, World Health Organization, 2020 Jan.
7. Sarkar A, Chakrabarti AK, Dutta S. Covid-19 infection in India: a comparative analysis of the second wave with the first wave. Pathogens. 2021;10(9):12-22.
8. Tendulkar P, Pandey P, Panda PK, Bhadoria AS, Kulshreshtha P, Mishra M, *et al*. Comparative study between first and second wave of COVID-19 deaths in India-a single center study, 2022. medRxiv.
9. Xiang G, Xie L, Chen Z, Hao S, Fu C, Wu Q, *et al*. Clinical risk factors for mortality of hospitalized patients with COVID-19: systematic review and meta-analysis. Ann Palliat Med., 2021, 2723-35.
10. Jalali SF, Ghassemzadeh M, Mouodi S, Javanian M, Kani MA, Ghadimi R, *et al*. Epidemiologic comparison of the first and second waves of coronavirus disease in Babol, North of Iran. Caspian journal of internal medicine. 2020;11(1):544.
11. Huang I, Pranata R, Lim MA, Oehadian A, Alisjahbana B. C-reactive protein, procalcitonin, D-dimer and ferritin in severe coronavirus disease-2019: A meta-analysis. Therapeutic advances in respiratory disease. 2020;14:17534666-20937175.