WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.084
Volume 11, Issue 12, 1170-1182. Research Article ISSN 2277– 7105

COMPARISON BETWEEN THE CLINICAL CHARACTERISTICS OF SECOND AND THIRD WAVES OF COVID-19: A RETROSPECTIVE STUDY

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Article Received on
22 June 2022,

Revised on 12 July 2022,
Accepted on 02 August 2022

DOI: 10.20959/wjpr202212-25186

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1. ABSTRACT

Aim: The aim of this study was to compare the clinical characteristics of patients affected with the second and third waves of COVID-19 admitted to a tertiary care hospital. **Method:** This was a retrospective observational study, which included 50 patients in the General medicine department of a tertiary care hospital in Trivandrum, India. **Result:** In our study, the most commonly reported symptom was found to be fever in both delta (84%) and omicron patients (72%). This is followed by cough (60%), dyspnea (56%) and tiredness (52%) in delta cases; sore throat (56%), cough (40%) and dyspnea (24%) in omicron cases. On evaluating the vitals, majority of the cases showed a normal SpO2 level and respiratory rate in both the delta and omicron waves. On assessing the D-dimer values, the delta (28%) and omicron (44%) cases showed a D-dimer of >0.5. In both waves, majority of the cases showed a higher ESR and a positive CRP value. While comparing the CT score of both waves, less pulmonary involvement was observed in omicron patients, hence the omicron variant was less likely to be associated with pneumonia. **Conclusion:** In this retrospective study of patients with SARS-CoV-2, infection with the delta variant was associated with a higher risk when compared with the omicron variant. The patients who were infected with the omicron variant had a lower disease severity and fewer hospitalization period. Majority of the patients with the omicron variant was vaccinated and hence resulted in milder form of infection.

KEYWORDS: COVID-19, Delta, Omicron, clinical characteristics.

2. INTRODUCTION

The COVID-19 pandemic caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) hit India in 2020.[1] First cases of COVID-19 were reported in Kerala on 30th January 2020.[2] Lock down was announced in India on 24 March 2020.[3] The first wave of COVID-19 in India came to an end by February 2021.[4] The second wave, caused by the delta variant was started in India by March 2021 and on May 7, 2021, India reported the highest number of cases (4.14 lakh) recorded in a single day during the second wave.[5][6] India began its vaccination program on 16 January 2021.[7] The country started its new year, January 2022, with the threat of highly transmissible, though milder, variant Omicron, the third wave of COVID-19.[6] The third wave in India doesn't become much severe as a result of vaccine coverage (72%).[8] Major symptoms during the second wave were headache, sore throat, runny nose, fever[9], loss of smell and dizziness.[10] Whereas, headache, sore throat, runny nose, fever, cough and muscle ache were commonly seen in third wave.[11]

Symptoms during omicron lasted less as compared to delta. The rate of hospital admission was also reduced during omicron cases due to less involvement of lower respiratory tract in omicron infections.[10][11]

3. MATERIALS AND METHODS

3.1. Aim of the Study

The aim of this study was to compare the clinical characteristics of patients affected with the second and third waves of COVID-19 admitted to a tertiary care hospital in Trivandrum, India.

3.2. Objectives

3.2.1. Primary Objective

To compare the clinical characteristics of the second and third waves of COVID-19.

3.2.2. Secondary Objective

- To assess the demographic details
- To assess the disease severity
- To assess the CT score
- To evaluate the efficacy of vaccination

- To assess the number of days of hospitalization
- To evaluate pneumonia as a complication of COVID-19

3.3. Study Design

This was a retrospective observational study, which included 50 patients in the General medicine department of a tertiary care hospital in Trivandrum, India. The study has been carried out for three months from April 2022 to June 2022.

3.4. Inclusion Criteria

- COVID-19 patients in the second and third waves
- Hospitalized patients

3.5. Exclusion Criteria

- Patients with incomplete medical records
- Pregnant women
- Pediatric population

4. RESULTS

A retrospective observational study was carried out for 3 months in a tertiary care hospital in Trivandrum, Kerala.

4.1 Demographic details of the patients

Age, gender and comorbidities were assessed in the demographic details of the patients.

4.1.1 Percentage distribution based on age group

Majority of the patients belong to the age group of 61-80 (delta:72%, omicron:68%) and next comes the age group 41-60 (delta: 24%, omicron:20%).

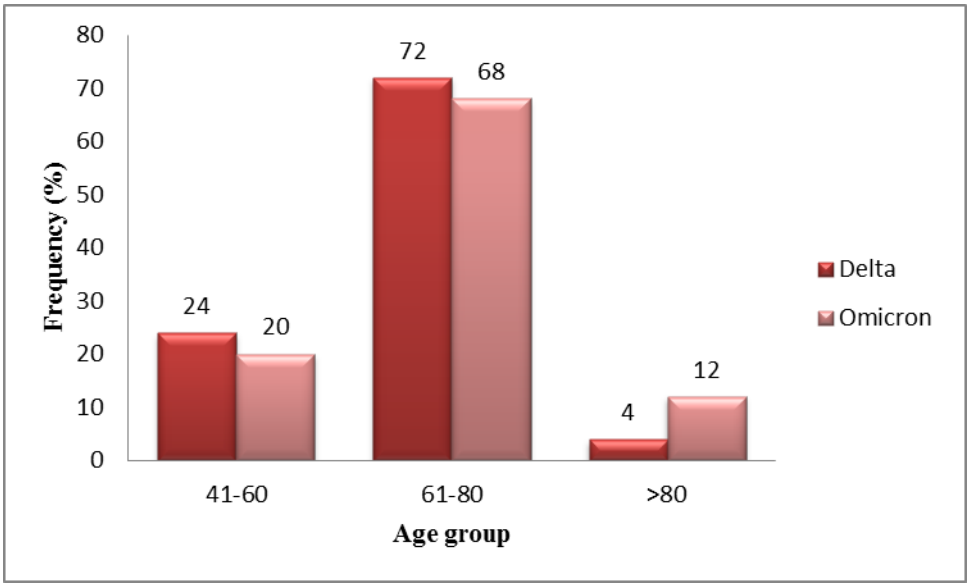

Figure 1: Percentage distribution of age.

4.1.2. Percentage distribution based on gender

Majority of the patients were females (delta: 44%, omicron: 64%) and the rest included males (delta:56%, omicron:36%).

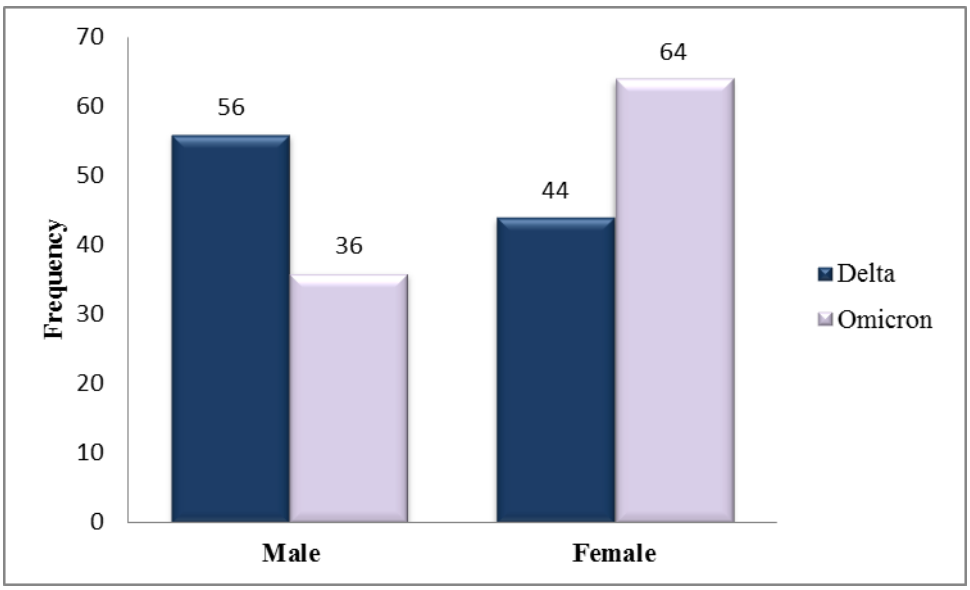

Figure 2: Percentage distribution of gender.

4.1.3. Percentage distribution based on comorbidities

Type 2 DM was the major comorbidity seen in both the delta (68%) and the omicron (64%) waves, followed by HTN (delta:64%, omicron:60%).

Table 1: Percentage distribution of comorbidities.

Comorbidities	Delta (%)	Omicron (%)
Type 2 DM	68	64
HTN	64	60
CAD	4	20
BPH	4	0
DLP	16	32
Hypothyroidism	16	4
COPD	0	8
Others	24	24

4.2. Clinical presentation of both waves

4.2.1. Percentage distribution based on symptoms

Fever was found to be the most common symptom in both delta (84%) and omicron (72%) cases.

Table 2: Percentage distribution of symptoms.

Symptoms	Delta (%)	Omicron (%)
Cough	60	40
Fever	84	72
Dyspnea	56	24
Sore throat	8	56
Tiredness	52	16
Rhinitis	8	4
Vomiting	16	12
Anorexia	12	0
Myalgia	8	20
Loose stool	4	0
Headache	0	8
Chest discomfort	0	8
Dizziness	0	4
Others	16	32

4.2.2. Percentage distribution based on disease severity

Most of the patients in the omicron wave showed a mild (80%) disease severity, while the delta wave showed a disease severity of moderate (40%) range.

Table 3: Percentage distribution of disease severity.

Severity	Delta (%)	Omicron (%)
Mild	24	80
Mild-moderate	12	4
Moderate	40	16
Moderate-severe	16	0
Severe	8	0

4.2.3. Percentage distribution based on SPO2

Majority of the cases showed a normal SpO2 level in both the delta (56%) and the omicron (64%) wave.

Table 4: Percentage distribution of SPO2.

SPO2 (%)	Delta (%)	Omicron (%)
85-89	12	0
90-94	32	36
95-99	56	64

4.2.4. Percentage distribution based on respiratory rate(RR)

84% of the delta cases and 76% of omicron cases showed a normal respiratory rate.

Table 5: Percentage distribution of respiratory rate.

RR	Delta (%)	Omicron (%)
15-19	0	24
20-24	84	76
>24	16	0

4.2.5. Percentage distribution based on D-Dimer

Majority of the delta cases (64%) showed a D-dimer of ≤0.5, while omicron cases (44%) showed a D-dimer of >0.5.

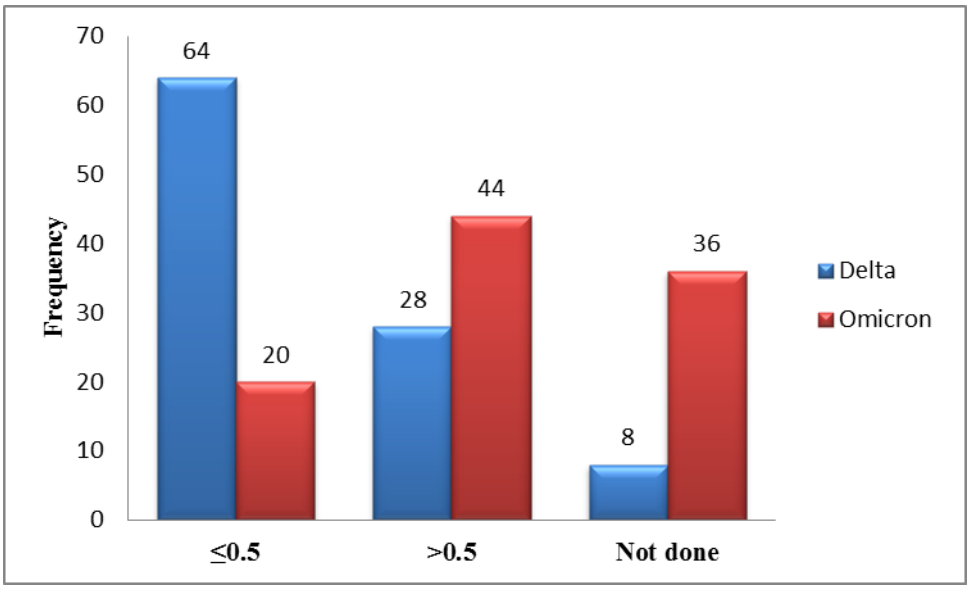

Figure 3: Percentage distribution of D-dimer.

4.2.6. Percentage distribution based on ESR

Most of the patients showed a higher ESR in both the delta (88%) and the omicron (52%) cases.

Table 6: Percentage distribution of ESR.

ESR	Delta (%)	Omicron (%)
0-22	12	36
23-50	40	36
>50	48	16
Not done	0	12

4.2.7. Percentage distribution based on CRP

Majority of cases (64%) in both waves showed a positive CRP value.

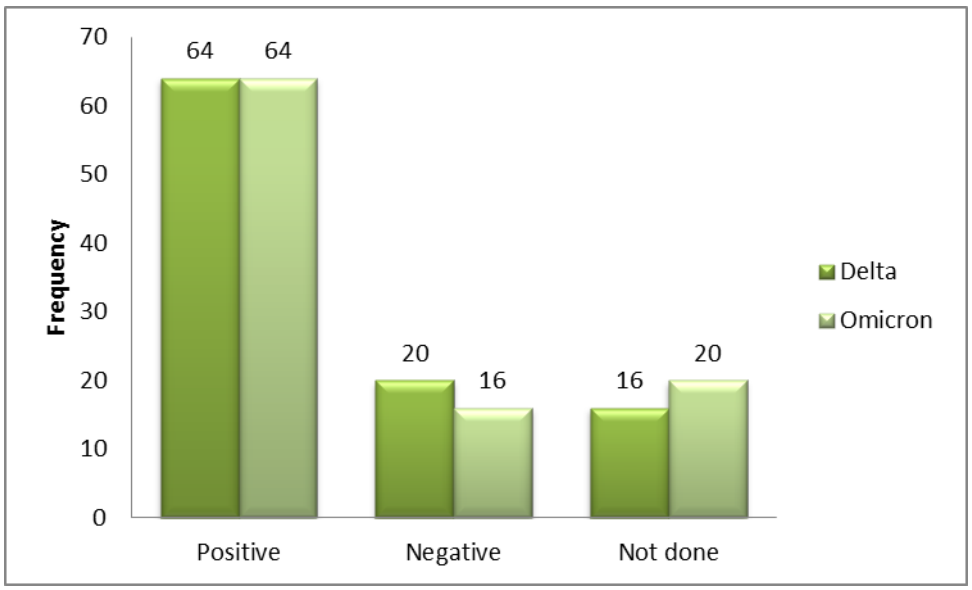

Figure 4: Percentage distribution of CRP.

4.2.8. Percentage distribution based on CT score

CT score data showed that pulmonary involvement is more common in delta than in omicron cases.

Table 7: Percentage distribution of CT score.

CT score	Delta (%)	Omicron (%)
≤7.0	32	56
8-18	56	16
>18	4	0
Not done	8	28

4.3. Percentage distribution based on vaccination

Majority of the patients in the delta cases were partially vaccinated, while most of patients were fully vaccinated in omicron cases.

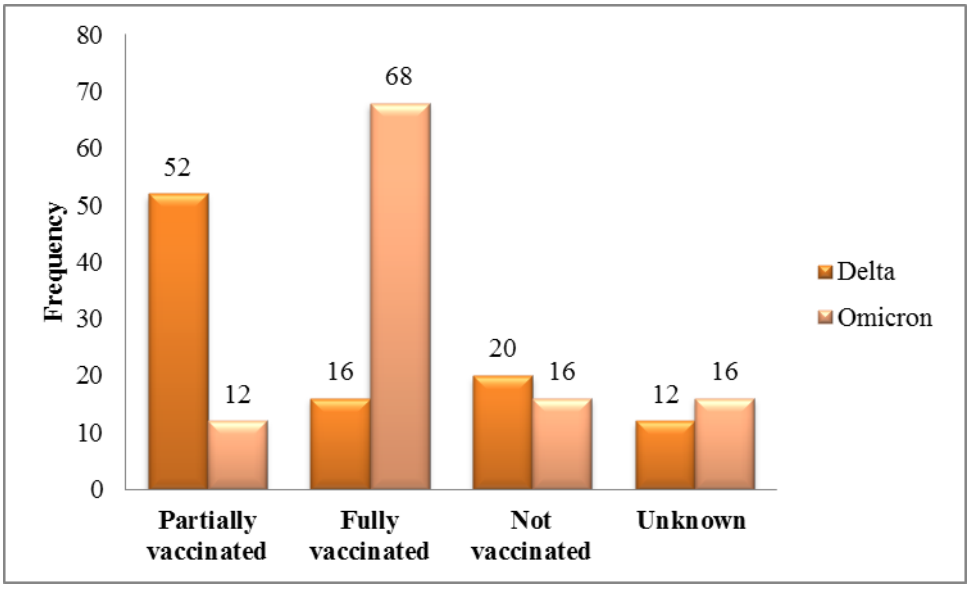

Figure 5: Percentage distribution of vaccination.

4.4. Percentage distribution based on hospitalization days

Majority of the patients were hospitalized for about a week in omicron (72%) cases. Whereas, in delta cases only 48% were hospitalized for a week and rest 40% were admitted for 14 days.

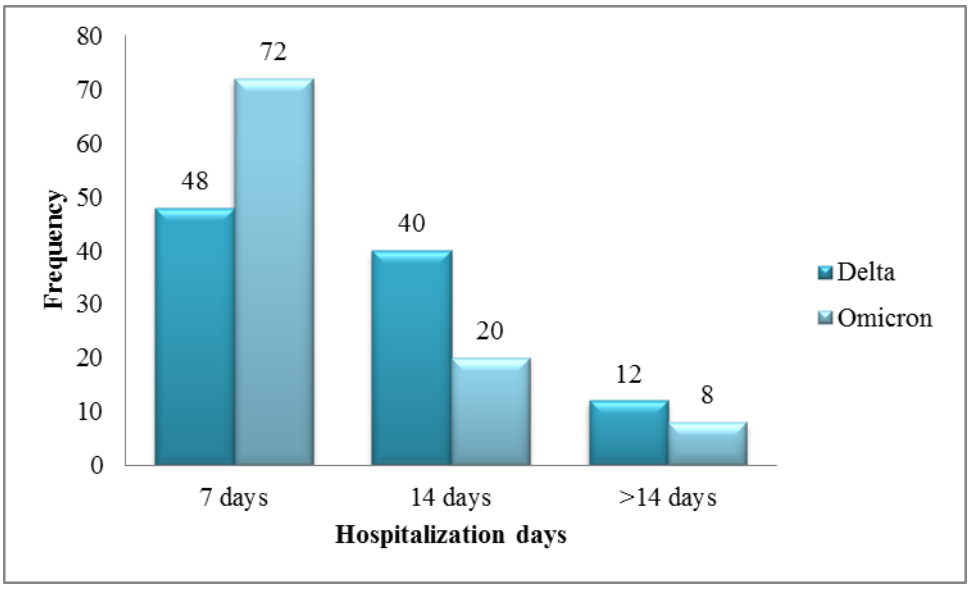

Figure 6: Percentage distribution of hospitalization days.

4.5. Percentage distribution based on pneumonia

Pneumonia was most commonly presented in delta cases (84%) and was absent in 48% of the omicron cases.

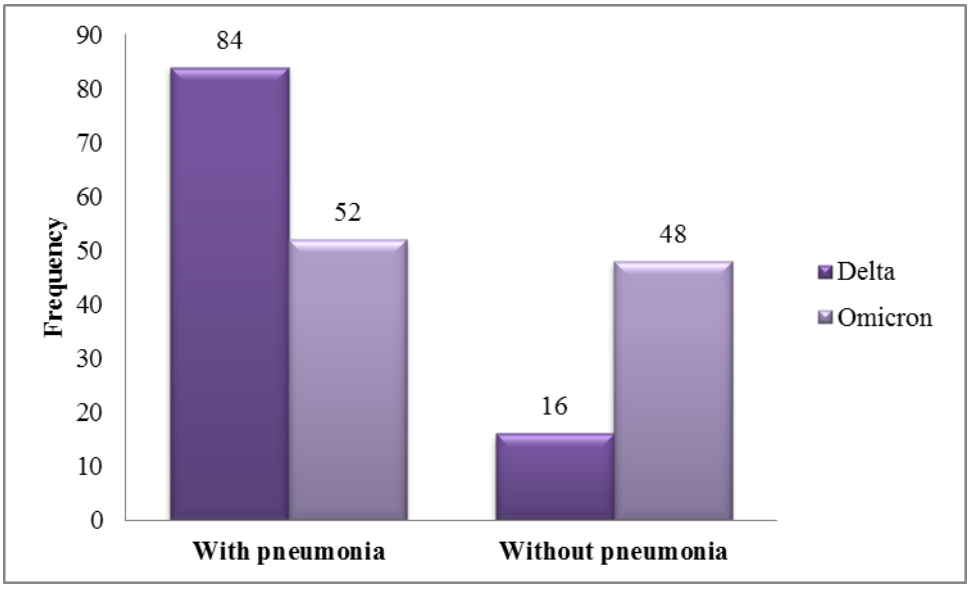

Figure 7: Percentage distribution of pneumonia.

5. DISCUSSION

A retrospective study was conducted to compare the clinical characteristics of 50 patients affected with the second and third waves of COVID-19, admitted to a tertiary care hospital in Trivandrum, India.

The study revealed that most patients belonged to the age group of 61-80, in that 72% of patients were delta cases and 68% patients were omicron cases. We observed a female predominance (delta:44%, omicron:64%) in our study which shows similarity to some other studies.[12-15]

Majority of the patients were having comorbidities as indicated by some of the studies.[13,16-18] Diabetes mellitus was the most reported comorbidity in both delta (68%) and omicron (64%) cases followed by hypertension (delta; 64% and omicron; 60%).

On assessing the clinical presentation of these patients, the most commonly reported symptom was found to be fever in both delta (84%) and omicron patients (72%). This is followed by cough (60%), dyspnea (56%) and tiredness (52%) in delta cases that has a close resemblance with the study conducted by Bouzid et al[17] and sore throat (56), cough (40%)

and dyspnea (24%) in omicron cases which shows resemblance to the studies conducted by *Zhang et al* and *Kim etal.*[19,12]

In our study, Omicron affected a population with a higher vaccination rate, as similar to other studies.[17,20] Infections caused by the Omicron variant were less severe than those caused by the delta variant.[12-14, 21] 80% of omicron cases in our study were mild, while only 24% of delta cases were mild, remaining 40% were moderate and 16% were moderate to severe cases.

On evaluating the vitals, most of the cases showed a normal SpO2 level in both the delta (56%) and the omicron (64%) wave and the respiratory rate were also normal in 84% of the delta cases and in 76% of omicron cases.

The study also analyzed the laboratory parameters like D-dimer, ESR and C- reactive proteins (CRP) in both waves. It was found that, the delta (28%) and omicron (44%) cases showed a d-dimer of >0.5. A higher ESR rate was observed in both delta and omicron cases. In both waves, 64% patients showed a positive CRP value.

While comparing the CT score of both waves, less pulmonary involvement was observed in omicron patients. This shows similarity to the findings from the study conducted by *Bouzid et al.*[17]

Majority of the patients were hospitalized for a week in both the delta (48%) and the omicron (72%) cases. However, 52% of patients were hospitalized for two or more weeks in case of delta compared to omicron (28%). This is in accordance with study conducted by *Wrenn et al.*[14] Compared to delta variant (84%), the omicron variant (52%) is less likely to be associated with pneumonia. Similar results were found in study conducted by *Bouzid et al.*[17]

6. CONCLUSION

In this retrospective study of patients with SARS-CoV-2, infection with the delta variant was associated with a higher risk when compared with the omicron variant. The patients who were infected with the omicron variant had a lower disease severity and fewer hospitalization period. Majority of the patients with the omicron variant was vaccinated and hence resulted in milder form of infection.

7. ACKNOWLEDGEMENTS

We would like to express our gratitude to Dr. Aneeta Toms, Assistant professor, Department of pharmacy practice, The Dale View College of Pharmacy and Research Centre, Trivandrum, for guiding us to conduct the study.

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