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Original Research

Clinico-Demographic characteristics of Third Wave by Omicron (B.1.1.529) variant of SARS-CoV-2 at a Tertiary Care Center, J&K India

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ABSTRACT:
To report the major characteristics of third wave due to emergence of Omicron variant(5.1.1.529) of the Covid-19 Pandemic in our region. **Material &Methods**: The third wave of COVID-19 occurred from January 2022 to February 2022 in the union territory of J&K, India. All samples were taken following ICMR guidelines for collecting, transporting, handling, and testing clinical specimens within the officially declared period of Omicron wave in J&K India. Vaccination status and other demographic information of the patients were collected via a proforma filled at the time of sample collection **Results:** 1,24,800 samples were tested using TaqPath PCR and 11,715 COVID-19 cases were reported with an average positivity of 9.38%. Males [6800, 58.04%] were affected more in comparison to females [4915, 41.9%]. The highest positivity was observed among the age group of 30-40 years of age [3439, 29.35%] followed by 20-30 years [2711, 23.14%]. Among the positives 9682(82.6%) were symptomatic. Majority of positive patients (84.3%) were fully vaccinated. The proportion of cases with omicron increased steadily each week during the month of January 2022 and started to decline by the mid of February**. Conclusion**: We conclude Omicron had high infectivity, but it caused less severe symptoms than the previous variants. The existing vaccines were also less effective against the fast-spreading Omicron variant, but boosters should strengthen immunity. Early and timely interventions including vaccination along with strengthened social distancing policies will always be key to suppression of the spread of Omicron variant.
Key Words: Omicron variant B.1.1.529; SARS-CoV-2, pandemic, Variant of concern (VOC), Genotyping COVID-19, RT-PCR.

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INTRODUCTION

To date, the union territory of J&K has experienced three waves of the Coronavirus disease (COVID-19) pandemic since the emergence of severe acute respiratory syndrome Coronavirus 2 (SARS-CoV-2) in December 2019. The new variant of COVID-19 was first reported to the World Health Organization (WHO) from South Africa on November 25 [1,2]. As per the WHO, the first known Omicron variant (B.1.1.529) infection was confirmed on 9th November 2021. On November 26, WHO named the new COVID-19 variant B.1.1.529 as 'Omicron' .WHO has classified Omicron as a 'Variant of Concern' (VOC). India detected its first Omicron case on 2nd December 2021 in Karnataka. Before being detected in India, Omicron cases had been found in 29 other countries across the globe. This omicron variant (B1.1.1.529) has a large number of mutations [3]. The Omicron has more than 50 mutations, of which the virus' spike protein has 26-35 amino acids that are different from the original SARS-CoV-2 virus or the Delta. One of the three target genes that is S gene, encoding for the spike protein is not detected during PCR testing, which is called S gene dropout or S gene target failure (SGTF), and can be detected in the three-target RT-PCR assay [4]. Preliminary studies till now have found that the Omicron variant had a higher affinity for human angiotensin-converting enzyme 2 (ACE2) than the Delta variant due to a significant number of

mutations in the SARS-CoV-2 receptor-binding domain (RBD), indicating a higher potential for transmission [3]. Based on docking studies, the Q493R, N501Y, S371L, S373P, S375F, Q498R, and T478K mutations leads to high binding affinity with human ACE2 receptors. In comparison to the Delta variant, a high proportion of hydrophobic amino acids such as leucine and phenylalanine in the Omicron variant are included both in the entire spike protein and the RBD. These amino acids are required for structural stability and are located within the protein's core. A disorder-order transition in the Omicron variant between spike protein RBD regions 468-473, and maybe significant in the influence of disordered residues/regions on spike protein stability and binding to ACE2 receptors[5]. Similar to many mutations invariants such as Delta and Alpha that are associated with immune escape and the potential for higher transmissibility there are considerable uncertainties with the Omicron such as transmissibility, severity, and pathogenicity, and the effect of the vaccine's protection against the Omicron infection[6,7,8].

MATERIALS AND METHODS

This retrospective descriptive study was conducted in the Covid Lab of the Postgraduate Department of Microbiology GMC Srinagar, a tertiary care center that is a teaching hospital and carters to a large population in the Kashmir division. All samples were taken from within the officially declared period of Omicron wave in our state of Jammu and Kashmir India. Vaccination status and other demographic information of the patients were collected via a performa filled at the time of sample collection. All the health care workers (HCWs) involved in sample collection and transport were trained appropriately and followed relevant SOPs. Before initiating sample collection, full personal protective equipment (PPE) was worn. For initial diagnostic testing of SARS-CoV-2 infections, ICMR recommends collecting and testing an upper respiratory specimen which includes Nasopharyngeal (NP) swabs, Oropharyngeal (OP) swabs [9]. On receipt, the samples collected from different locations spread around the state were processed in the biosafety level III (BSL III) laboratory. A real-time RT-PCR assay in accordance with the manufacturer's instructions was used for the detection of ribonucleic acid (RNA) from SARS-CoV- 2 present in the swabs from patients suspected of COVID-19. RNA extraction and purification were done for all the specimens using the Invitrogen, Pure-Link Viral RNA/DNA Mini Kit by Thermo Fisher scientific. Extracted and purified RNA was reverse transcribed to cDNA and subsequently amplified using the ABI 7500 Fast DX RT-PCR thermocycler. Merril COVID-19 One-Step RT-PCR Kit was used which is a one-step kit wherein the N- gene and ORF-1ab were used for detection of SARS-CoV-2 specific RNA. To ensure the integrity and verification of RT-PCR assay results, an internal control (IC) was analyzed for each patient sample, also testing one replicate of the positive control and one replicate of the negative control in each batch was used. A cycle threshold value (Ct value) < 35 was defined as a positive test result, and a Ct value of ≥ 40 was defined as a negative test result. A Ct value of 35 to less than 40 was reported as Inconclusive, with a request to repeat sampling [10, 11].

RESULTS

From the first week of January 2022 through the end of February 2022.1,24,800 samples were tested using TaqPath PCR and 11,715 COVID-19 cases were reported at our tertiary care center with an average positivity of 9.38% over a period of 2 months.

Chart1: Ratio of total number of tests done to the total number of positives during third wave of Omicron (B.1.1.529) Covid-19 pandemic

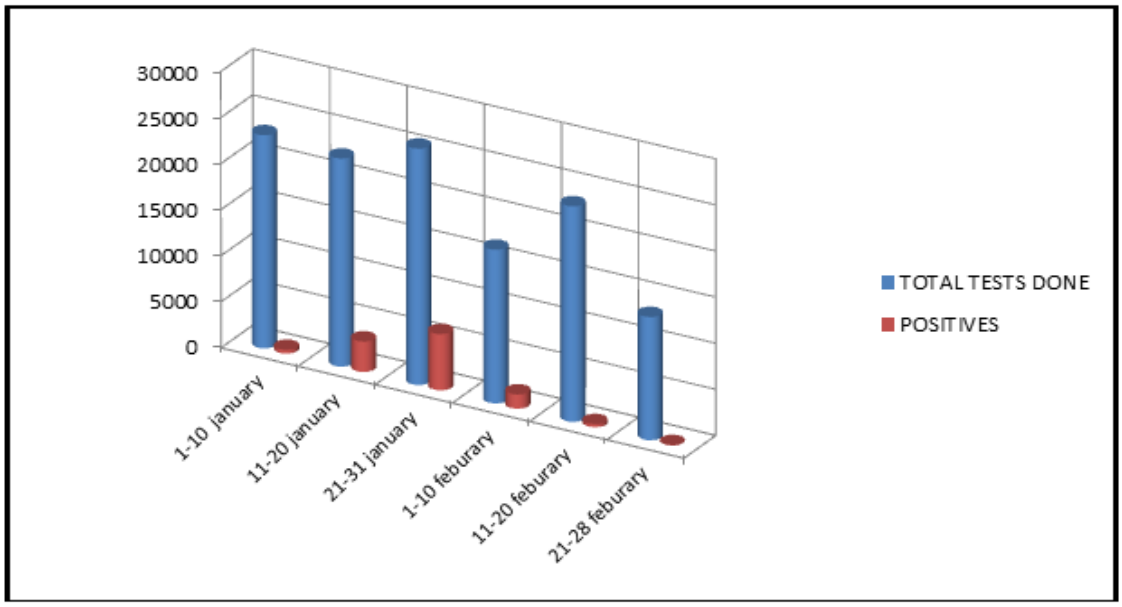

Table1: Clinico-demograpic Characteristics Of omicron (B.1.1.526) at our tertiary care center.

S.NO	Parameters		Percentage%
1.	Time periods of COVID-19pandemic	First week of January 2022 to ending Feburary2022	
2.	Incubation period (IP)	3-5 days	
3.	Total number of tests done Total positives Total negative	124800 11715 113085	 9.38% 90.61%
4.	Gender (n=11715) Male Female	 6800 4915	 58.04% 41.9%
5.	Age (n=11715) 0-10 10-20 20-30 30-40 40-50 50-60 >60	 721 1058 2711 3439 1694 1210 884	 6.15% 9.03% 23.14% 29.35% 14.46% 10.32% 7.54%
6.	Symptoms (n=11715) Symptomatic Asymptomatic	 9682 2033	 82.64% 17.35%
6	Presenting symptoms(n=11715) Fever Sore throat Cough Breathing difficulty Abdominal pain Loss of smell/ taste Nausea/vomiting diarhoea	 7499 7112 6401 1688 1288 1084 906 312	 64.01% 60.70% 54.63% 14.4% 10.99% 9.25% 7.73% 2.6%
7.	Comorbidities	4280	36.53%
8.	Vaccination status (n=11715) Vaccinated with 2.doses Unvaccinated	 9883 1832	 84.3% 15.63%

Chart 2: Linear trends in number of cases during the Omicron third wave pandemic over a period of two months

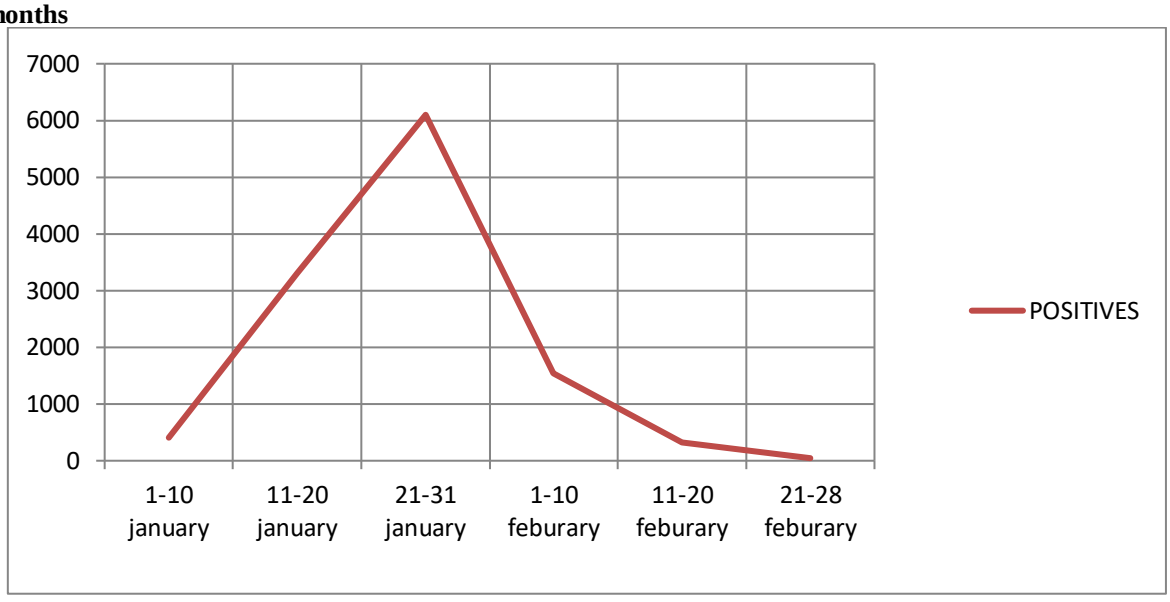

Table 2: Categories of patients with Omicron(B.1.1.529) based on clinicalclassification and its relation to comorbidities

Categories	Percentage %	Comorbidities, n =4280(%)
Asymptomatic	2033(17.35%)	203(4.74%)
Mild symptoms	4389(37.46%)	849(19.83%)
Moderate symptoms	3568(30.45%)	2280(53.27%)
Severe symptoms	1725(14.72%)	948(22.14%)

The incubation period was 3-5 days. 6800 (58.04%) were males and highest positivity was seen among the age group of 30 -40 years 3439(29.35%). The majority of Covid positive patients were symptomatic 9682 (82.64%) with the predominant symptom being fever 7499 (64.01%) followed by sore throat 7112 (60.70%), and cough 6401 (54.63%). Our study found that 4280(36.53%) patients with comorbidities were infected during the third wave of the Covid-19 pandemic (Table: 2). In this study, it was observed that a major chunk of patients 9883(84.3%) who were infected with Omicron were fully vaccinated with two doses of vaccine as per the vaccination program of our country (Table 1). As per our study, the third wave was at its highest peak from 21st January 2022 until 31st January 2022 and started to decline from 11th February onwards (Chart 1, Chart 2).

DISCUSSION

This retrospective study was conducted at the VRDL section of GMC Srinagar, a tertiary care teaching institute and an apex referral center in the union territory of J&K, India. The present study included all the individuals that were tested at our facility during the third wave pandemic from 1st January 2022 to 28th February 2022 with an average positivity of 9.38%. The proportion of males was found to be higher than females, which is similar to the findings of the other studies from India [4]. The reason for male predominance in our study may be due to the fact that males tend to travel more and are more actively engaged in outdoor activities as compared to females [12]. In this study, the positivity was higher among the age group of 30 -40 years (29.35%) and is similar to the study by Nyberg et al that found strong evidence of age dependence. A number of studies have indicated that the clinical severity of infection is lower for omicron than for delta.[13,14]. In this study Omicron was associated with fewer lower and more upper respiratory tract symptoms. Laboratory studies have shown that Omicron replicates more in upper airway cells and less in the lungs hence leading to less severe disease [15,16]. As the highly-transmissible SARS-CoV-2 Omicron variant increases in incidence, coincident with other winter respiratory viruses circulating in the Northern hemisphere, changes in symptomatology have influenced the clinical and testing policy. The proportion of cases with omicron increased steadily each week during the month ofJanuary 2022. Associated comorbidities are an important factor to determine disease outcomes [17]. Our study found that patients with comorbidities, particularly diabetes and/or chronic kidney disease, had more severe disease when compared to the patient without comorbidities. Similar findings were noted in other studies and the most common associated comorbidities observed were diabetes, coronary artery disease, chronic obstructive pulmonary disease, and chronic kidney disease [17,18]. It is not inevitable that viral evolution leads to lower severity [19,20,21]. It has been seen in many studies that risk of hospitalization appeared to increase when comparing delta with alpha infections and when comparing alpha with previously circulating lineages [22,23] Hence in our study we have observed there is an increase in transmissibility along with the detrimental change in COVID-19 epidemiology, change in clinical disease presentation as well as a decrease in the effectiveness of public health and social measures and available diagnostics, vaccines and therapeutics.

CONCLUSION

We documented the epidemiological characteristics and clinical manifestation of COVID-19 among patients from North India. We also focused on comorbidities associated with the Omicron variant which can help clinicians in early screenings of high-risk patients and judicious utilization of healthcare resources among these patients to prevent the more severe disease. However, a detailed understanding is needed of how reductions in both severity and immunity have shaped observed patterns of hospitalizations and deaths in the omicron wave, and there has been the scarce characterization of age variation in the severity of omicron infection to date.
The present study also looked atimmune escape after both vaccinations. We conclude Omicron had high infectivity, but it caused less severe symptoms than the previous variant. The existing vaccines were also less effective against the fast-spreading Omicron VOC, but boosters should strengthen immunity. So, early careful preventive steps including vaccination were always the key to the suppression of the Omicroninfection.

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CONFLICT OF INTEREST

None

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