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## Original Article

## Differences in age distribution in first and second waves of COVID-19 in eastern Uttar Pradesh, India

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## ABSTRACT

Comparison of first and second waves of Coronavirus disease (COVID-19) showed varied differences including the peak and time distribution. Contrary to published reports of comparing two waves in India wherein the younger age group was affected more in the second wave in India; a secondary data analysis of around 0.5 million real-time reverse transcription-polymerase chain reaction tests conducted in COVID-19 diagnostic laboratory in eastern Uttar Pradesh, India showed an increase in positivity rate in older age groups in the second wave. The positivity rate among symptomatic cases was found to be three times higher in second wave compare to the first wave. Higher positivity rates were seen across older age groups, with a shift of 11 years in the mean age of positivity in the second wave compared to the first.

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Coronavirus disease (COVID-19) has emerged as a global pandemic affecting all countries and regions of the world [1]. Published literature reports that the second wave in India has affected the younger age group with the reason for the same to be explored further [2,3]. The epidemiological trends revealed two waves, first wave (July–December 2020) and second wave (April–June 2021) in Uttar Pradesh (UP) state of India. Indian Council of Medical Research – Regional Medical Research Centre (ICMR-RMRC), Gorakhpur was the first diagnostic laboratory set up for COVID-19 testing in eastern UP. Initiated testing on March 23, 2020, with a responsibility to cater to the entire region of eastern UP, the first positive case was documented from our centre on March 31, 2021 [4]. Following this, the centre has been receiving samples to date from various districts of eastern UP. A secondary data analyses of the routine COVID-19 laboratory surveillance available for samples tested at our centre during these two waves was conducted to compare the trends across age groups, gender and symptom status.

A total of 2,19,832 and 2,34,815 samples were tested using real-

time reverse transcription-polymerase chain reaction (rRT-PCR) at our centre in the first wave and second wave respectively. The overall test positivity rate as well as test positivity rate among the symptomatic and asymptomatic cases were significantly higher in the second wave as compared to the first wave (Table 1). There was a marked difference between the first and second waves in terms of positivity rate among symptomatic cases (4.4% versus 14.3% respectively).

Among adults ( $\geq 18$  years) the positivity rate showed an increasing trend as we move across different age groups in second wave compared to almost similar numbers in all age groups the first wave (Table 1). The mean age of positive cases was found to be significantly higher in the second wave ( $46.1 \pm 16.8$  years) as compared to the first wave ( $35.1 \pm 15.9$  years). There was an increase in positivity rates across all age groups in the second wave (Table 1). The increase was markedly higher in older age groups in the second wave (about four times higher than the first wave). The positivity rate of males was higher than females in both waves.

Analysis of the results from our centre shows contrasting findings from published literature in showing higher positivity rates among the older age groups, with a shift of 11 years in the mean age of positivity; the reasons for which needs to be further explored.

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**Table 1**

Socio-demographic characteristics across COVID-19 rRT-PCR positivity status in first and second waves in ICMR-RMRC Gorakhpur COVID-19 Laboratory (N = 454647).

Characteristic	First Wave		Second Wave		p value <sup>b</sup>
	Total, n	COVID-19 Positive, n (%) <sup>a</sup>	Total, n	COVID-19 Positive, n (%) <sup>a</sup>	
<b>Total number positive</b>	219832	4084 (1.9)	234815	9596 (4.1)	<0.001
<b>Age (years)</b> (Mean ± Standard Deviation)	30.0 ± 16.6	35.1 ± 15.9	34.4 ± 17.3	46.1 ± 16.8	<0.001 <sup>c</sup>
<b>Age category (years)</b>					
<18	62313	501 (0.8)	38410	418 (1.1)	<0.001
18–29	59445	1164 (2.0)	62445	1383 (2.2)	0.002
30–44	51842	1261 (2.4)	64609	2213 (3.4)	<0.001
45–59	28705	772 (2.7)	42903	3068 (7.2)	<0.001
60–74	15620	337 (2.2)	23478	2164 (9.2)	<0.001
≥75	1907	49 (2.6)	2970	350 (11.8)	<0.001
<b>Gender</b>					
Male	136904	2988 (2.2)	154505	6507 (4.2)	<0.001
Female	82897	1096 (1.3)	80280	3087 (3.8)	<0.001
Transgender	31	0	30	2 (6.7)	–
<b>Symptomatic</b>					
Yes	180	8 (4.4)	300	43 (14.3)	0.001
No	219652	4076 (1.9)	234515	9553 (4.1)	<0.001

<sup>a</sup> All percentages are row percentage calculated for row total in respective waves.<sup>b</sup> Pearson's Chi-square test.<sup>c</sup> Independent samples 't' test.

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### Ethical approval

Not applicable.

### Authors contributions

KZ and MMR conceived and designed the study; SKM and PY was involved in acquisition of data; MMR, KZ, SKM and PY were involved in analysis and interpretation of data; MMR and KZ wrote the first draft; RK revised the manuscript and gave critical inputs; All authors approved the final version submitted for journal.

### Declaration of competing interest

The authors 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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