

Original Research Article

An exploratory study of 3rd wave features of COVID-19 patients admitted in a level 3 medical institution of Uttar Pradesh, India

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ABSTRACT

Background: COVID-19 3rd wave has shown not only less deaths but also limited symptomatic patients in India with few numbers of casualties as compared to first and second wave. The exact scientific reason behind this needs detailed study. There is an urgent need for a study aimed towards detection of low mortality and morbidity in 3rd wave of COVID-19 patients from a level 3 medical college hospital in western Uttar Pradesh district in India so as to find and develop new management strategies for COVID-19 patients in future next COVID-19 waves.

Methods: This study was aimed to find morbidity and mortality factors of COVID-19 3rd wave among COVID-19 patients in a level 3 medical college hospital in western UP district Saharanpur in India from 1st January 2022 to 30th June 2022.

Results: The demographic profile of patients admitted in our level 3 medical college hospital in western UP district in India; had no significant ($p>0.05$) association with morbidity and mortality in COVID-19 3rd wave, but vaccination doses as it increased from 1st to 2nd had significant association ($p=0.05$) with less mortality and morbidity in COVID-19 3rd wave those who received the vaccines.

Conclusions: Possibly COVID vaccination doses had a positive boosting effect on immune system of COVID-19 patients, which may have caused Virus to be less damaging to Immune system leading to decreased morbidity and mortality and in COVID-19 patients in wave 3.

Keywords: COVID-19, COVID-19 vaccination, Level 3 hospital, Morbidity, Mortality, Wave 3

INTRODUCTION

The rapid development of vaccines and mass COVID 19 vaccination programmes has possibly helped to manage COVID-19 waves. COVID-19 3rd wave has shown not only less deaths but also limited symptomatic patients in India with few number of casualties as compared to first and second wave. It was seen in a Max study that 60%

COVID deaths in 'third wave' among partially completely unvaccinated.¹ With an updated and robust vaccination campaign along with public measures like the avoidance of large gatherings possibly helped to counter the third wave. Over 50% of the eligible population in India were fully vaccinated at that time.²

In the comparative study of the all 3 waves of the COVID-19 pandemic it revealed that only 23.4 per cent

of the patients required oxygen support during the third wave, as compared to 74 per cent during the second wave and 63 per cent during the first waves with only 41 admissions of minors.³ One study in India UP has revealed that in wave 2 COVID-19 virus most likely operated differently at cardio-respiratory system leading to increased mortality in COVID-19 patients.³ In another study on mortality in Chennai (India) it was found that mortality increased substantially but heterogeneously during the COVID-19 pandemic 1st and 2nd wave, with the greatest burden on disadvantaged communities.⁴ However one report on COVID 3rd wave revealed that the deaths recorded were largely among those aged over 70 and those suffering from multiple co-morbidities such as kidney diseases, heart diseases, diabetes, cancers etc.⁵

From another report on COVID-19 3rd wave it revealed that deaths reported were significantly lower (10%) in the fully vaccinated, where 91% of those who died had co-morbidities, as opposed to deaths in the unvaccinated (21%), where 83% of the deceased had co-morbidities.⁶ The latest data of Indian Government also revealed that 16 states/union territories achieved 100% first dose vaccination coverage, while 6 states/union territories registered 100% second dose coverage.⁶ Therefore the exact scientific reason behind less COVID-19 morbidity and mortality in 3rd wave needs detailed study. So there is an urgent need for a study aimed towards detection of low mortality and morbidity in 3rd wave of COVID-19 patients from a level 3 medical college hospital in western UP district in India. So as to find and develop new management strategies for COVID-19 patients in future next COVID-19 waves.

METHODS

This study was aimed to features of COVID 3rd wave mortality factors among COVID-19 patients in a level 3 medical college hospital (SMMH Government Medical College Hospital) in western up district Saharanpur in India from 1st January 2022 to 30th June 2022. The study aimed towards finding better vaccination strategies for COVID-19 patients for the next COVID-19 waves.

This study was carried out in India on patients admitted in a level 3 medical college hospital of India, for which the ICMR's Ethical guidelines for biomedical and health research on human participants (2017) were strictly adhered.

The study was carried out in COVID-19 control room in collaboration with department of community medicine, medicine and anesthesia.

The study was started after approval from IEC committee in charge and principals of medical college.

The confidentiality in study was ensured by not disclosing the identity of patients. The authorization letter

was obtained from principal and study was approved by IEC committee.

The working definition of UP Government of COVID-19 guidelines as per ICMR recommendations for COVID 3rd wave was followed. According to which patient was considered COVID-19 disease if Patient had fever, cough, and breathlessness suggestive of COVID-19 with confirmation from RTPCR test from BSL-2 lab in medical college.

The following study criteria was taken: the present study was undertaken on all patients secondary data admitted in various wards of level 3 hospital from 1st January 2022 to 30th June 2022. Only patients of COVID-19 wave 3 were included but patients admitted in wave 1 and 2 were not enrolled. The secondary data from control room were taken from data entry operator of control room till the last patient of COVID-19 3rd wave was admitted in this medical college hospital.

All patients of any age, sex, religion, and caste who were admitted in various wards of a level 3 medical college hospital in a western UP district Saharanpur India were included in this study. So total sample size considered was 84 as according to total number of patients who were finally taken for study. The data from COVID control room from a level 3 medical college hospital in a western UP district in India were finally undertaken and analyzed.

Statistical analysis was done by software Epi-Info version 7.2.2.2. The proportions were calculated and Chi-square test of significance was applied to know p values.

RESULTS

The key age group of our study subjects were young (25-44 years) in 3rd wave of COVID 19 (36.9%) (Table 1).

Table 1: Age and sex wise distribution of study subjects (N=84).

Age (in years)	F (%)	M (%)	P value
5-24	6 (7.1)	9 (10.7)	0.2897 (not significant)
25-44	20 (23.8)	11 (13.1)	
45-64	11 (13.1)	8 (9.5)	
65-84	8 (9.5)	11 (13.1)	

Table 2: Age wise outcomes distribution among study subjects (N=84).

Age (yrs)	Improved and discharged (%)	Expired (%)	Other (%)	P value
5-24	13 (15.5)	0 (0)	2 (2.4)	0.22 (not significant)
25-44	26 (31)	1 (1.2)	4 (4.8)	
45-64	13 (15.5)	2 (2.4)	4 (4.8)	
65-84	10 (11.9)	4 (4.8)	5 (6)	

The demographic profile of patients admitted in our level 3 medical college hospital in western UP district in India like age and sex had no association ($p>0.05$) with morbidity and mortality in COVID-19 3rd wave (Table 2 and 3).

Table 3: Sex wise outcomes distribution among study subjects (N=84).

Outcome	M (%)	F (%)	P value
Abscond	1 (1.2)	2 (2.4)	0.925 (not significant)
DOPR	2 (2.4)	3 (3.6)	
Expired	2 (2.4)	5 (6)	
Expired non COVID	(0)	1 (1.2)	
Improved and discharge	31 (36.9)	31 (36.9)	
LAMA	1 (1.2)	1 (1.2)	
Refer	2 (2.4)	2 (2.4)	

As COVID 19 vaccination doses increased from 1st to 2nd dose- it had a significant association ($p=0.05$) with less mortality and morbidity in COVID-19 3rd wave in those who received the higher doses of vaccines (Table 4).

Table 4: Vaccination doses wise outcomes distribution among study subjects (N=84).

COVID vaccinated	Improved and discharged	Expired	P value
1 st dosage	4 (4.8%)	1 (1.2%)	0.05 (significant)
1 st dosage 2 nd dosage	45 (53.6%)	3 (3.6%)	
No vaccine received	13 (15.5%)	3 (3.6%)	

DISCUSSION

In COVID-19 3rd wave there were many challenging factors such as emergence of new strains like the alpha, beta, kappa, and delta variants of concern for vaccine resistance. There were also challenges such as inadequate data collection, public unawareness, fake news, irregular vaccine supply and the presence of mutant variants. Travel restrictions, personal protective equipment shortages, and barriers to healthcare access were important obstacles to overcome in all 3 COVID-19 waves.²

The Bloomberg vaccination tracker also reported India's vaccination campaign in second place, in terms of doses administered. Despite the challenging prospect of vaccinating such a large population of 1.4 billion people, India has put up a valiant effort, achieving one of the highest rates of vaccination across the world who results are possibly reflected in COVID-19 3rd wave in India.²

One study in India UP also revealed that in wave 2 COVID-19 virus most likely operated differently at

Cardio-respiratory system leading to increased mortality in COVID-19 patients. In this study on COVID-19, the most common co-morbidity was type 2DM (52% and 36.4%, respectively), but DM was found to be more in COVID +ve patients of wave 1 as compared to wave 2 COVID +ve patients whereas any cardiac abnormality co-morbidity was found more in Wave 2 patients as compared to wave 1 (14.2% versus 12.1%).³

Our study finding corroborates with a study by a private hospital which found that 60 per cent of the patients who died during the current wave of COVID-19 pandemic were either partially or fully unvaccinated. This study by Max Healthcare said that the deaths reported were largely among those aged over 70 and those suffering from multiple co-morbidities such as kidney diseases, heart diseases, diabetes, cancers etc.¹ Another report from literature also reveals that there were around 60% deaths partial or unvaccinated patients in COVID-19 3rd wave.⁵

COVID-19 third wave in India saw an increase in number of younger in-patients. But vaccination offered significant protection.⁶ From this report on COVID-19 3rd wave it revealed that deaths reported were significantly lower (10%) in the fully vaccinated, where 91% of those who died had co-morbidities, as opposed to deaths in the unvaccinated (21%), where 83% of the deceased had co-morbidities, this finding is just similar to our present study.

In another study the comparative characteristics of the descriptive epidemiology of three pandemic waves differed significantly. The second COVID-19 wave was different from the first wave and third wave, with more deaths in the young, and increases in the proportions of deaths with diabetes, maternal deaths, and deaths in those without any pre-existing co-morbidities. The third-wave had more deaths in the elderly and a shorter duration from symptom onset to death.⁷

One study stressed that co morbidities were present invariably in 74% of deaths from SAR-CoV-2 infection and primary and booster vaccination against COVID-19 could be one way to do that.⁷ As similar to findings of our present study.

The mRNA vaccines of Pfizer and Moderna, were more effective against the Delta strain was also a major concern for the COVID-19 third wave in India.⁸ According to a study published in the Journal of Immunity, Delta Plus had new mutations.⁹ The Delta Plus variant is even more concerning than the Delta variant, as it was 60% faster spreading. Early-stage lung involvement and longer-lasting fever were some of the concerning symptoms of this variant.¹⁰

But COVID-19 3rd wave challenges persisted despite mass vaccination such as the lack of correct data about mortality and morbidity of the viral infection.¹¹ Underreporting of the number of cases and deaths due to

COVID-19 was also seen in India. However, we must also appreciate that although the COVID-19 third wave of the pandemic in India lasted from January till March 2022, but breakthrough infections were also common in this 3rd wave and 3rd dose of vaccine was rolled out to priority groups in the beginning of 2022.¹²

Although this study tried to enroll all patients of COVID-19 3rd wave from hospital; but due to smaller sample size, generalization of finding of this study is restricted.

CONCLUSION

From our study we can say that possibly COVID vaccination doses had a positive boosting effect on immune system of COVID-19 patients, which may have caused virus to be less damaging to immune system leading to decreased morbidity and mortality in COVID-19 patients in wave 3. However, our findings need further exploration by other larger similar studies in the field on COVID 3rd wave across the world to have more clarified picture on this critical issue.

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