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Treatment Patterns, Vaccination Status and Clinical Outcomes among Hospitalised COVID-19 Patients in Eastern India: A Multicentric Observational Study

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ABSTRACT

Background: COVID-19 has been associated with substantial morbidity and mortality worldwide, particularly among hospitalised patients. Evidence regarding real-world treatment patterns, vaccination status and clinical outcomes from eastern India remains limited.
Methods: A prospective, multicentric, observational study was conducted across five government hospitals in eastern India between June 2021 and August 2021. Hospitalised patients with RT-PCR or rapid antigen test confirmed COVID-19 were enrolled. Demographic characteristics, comorbidities, vaccination status, laboratory parameters, medication usage, oxygen supplementation and clinical outcomes were analysed. The study was undertaken as part of a Government of West Bengal initiative to inform state health-policy formulation. Total study duration including analysis and report submission was six months.
Results: Out of 241 recruited patients, 233 (96.68%) were evaluable. Mean age was 54.35 ± 17.19 years. Most patients were unvaccinated (79.40%). Oxygen supplementation was required in 72.96% and systemic corticosteroids were administered in 87.98%. Overall mortality was 6.01%, while 92.70% were discharged. Sepsis and acute kidney injury were significantly associated with mortality, whereas steroid use was associated with improved survival.
Conclusion: Appropriate pharmacotherapy, timely oxygen supplementation and judicious steroid use significantly influenced outcomes among hospitalised COVID-19 patients and provide actionable evidence for health-system preparedness.

Keywords*: COVID-19, Treatment patterns, Vaccination; Steroids, Oxygen therapy, Outcomes.*

INTRODUCTION

Coronavirus disease 2019 (COVID-19), caused by SARS-CoV-2, emerged as a global public-health emergency with a wide clinical spectrum ranging from mild respiratory illness to severe pneumonia, ARDS, sepsis and death [1–5]. Hospitalised patients contributed disproportionately to morbidity, mortality and healthcare burden [6–8].

During the pandemic, treatment practices evolved rapidly based on emerging evidence, resource availability and regional protocols [9–11]. Oxygen supplementation and systemic corticosteroids became cornerstones of inpatient management in hypoxaemic disease [12–16]. However, real-world data evaluating vaccination status, pharmacotherapy and outcomes from eastern India are limited. This study aimed to generate multicentric evidence to inform clinical practice and state-level health-policy decisions.

MATERIALS AND METHODS

Study Design, Centres and Period

Prospective, multicentric, observational study conducted across five government hospitals in eastern India between June 2021 and August 2021.

Administrative Context and Duration

The study was undertaken as part of a Government of West Bengal–supported initiative to understand treatment patterns and outcomes of hospitalised COVID-19 patients for policy formulation. The total study duration, including data collection, analysis and submission of the final report, was six months.

Study Population

Hospitalised patients of any age and sex with RT-PCR or RAT confirmed COVID-19 were included. Pregnant/lactating women and patients with pre-existing critical illnesses likely to independently influence outcomes were excluded.

Recruitment and Data Collection

Patients were enrolled over a defined 10-day recruitment period at each centre. Data were collected using structured case-record forms from medical records and patients were followed until discharge or death.

Ethics Approval

Approved by the Institutional Ethics Committees of all participating centres and the Department of Health and Family Welfare, Government of West Bengal (Approval No. RKC/461, dated 29 May 2021).

Statistical Analysis

Analysis was performed using SPSS v20. Continuous variables were expressed as mean ± SD or median (IQR); categorical variables as frequencies and percentages. $p < 0.05$ was considered statistically significant.

RESULTS

Baseline Characteristics

A total of 233 patients were analysed. Sex distribution was retained as per the original dataset. Hypertension (39.91%) and diabetes mellitus (24.03%) were the most common comorbidities.

Table 1. Baseline demographic and clinical characteristics

Variable	Value
Age (years), mean ± SD	54.35 ± 17.19
Female gender, n (%)	131 (56.22)
Male gender, n (%)	93 (39.91)
Hospital stay (days), mean ± SD	11.18 ± 6.92
Unvaccinated, n (%)	185 (79.40)
Symptomatic at admission, n (%)	216 (92.70)
RT-PCR confirmed cases, n (%)	197 (84.55)
Hypertension, n (%)	93 (39.91)
Diabetes mellitus, n (%)	56 (24.03)

Clinical Features and Complications

Fever, cough and breathlessness were common presenting symptoms. Pneumonia (42.92%) and ARDS (36.05%) were the most frequent complications.

Table 2. Distribution of comorbidities

Parameter	n (%)
Required oxygen during hospital stay	170 (72.96)
Oxygen via nasal cannula	101 (45.06)
Oxygen via face mask	97 (41.63)
Oxygen via NRBM	64 (27.47)
Oxygen via HFNC	2 (0.86)
Received corticosteroids	205 (87.98)

Proning performed	116 (49.79)
IV fluids administered	224 (96.14)
Discharged alive	216 (92.70)
In-hospital mortality	14 (6.01)

Table 3. Symptoms and complications

Parameter	Admission (Mean ± SD)	During Stay (Mean ± SD)	*p* value
Platelet count (×10³/cmm)	217.43 ± 111.92	256.12 ± 138.44	**0.013**
CRP (mg/L)	40.58 ± 59.26	20.18 ± 28.53	**<0.001**
D-dimer (ng/mL)	63.81 ± 215.34	112.38 ± 282.88	**0.038**
Ferritin (mg/L)	645.43 ± 837.00	439.88 ± 521.03	**0.002**
IL-6 (pg/mL)	104.01 ± 135.82	8.39 ± 9.85	**<0.001**
Pro-calcitonin (ng/mL)	0.18 ± 0.13	0.07 ± 0.04	**<0.001**
RBG-FBG (mg/dL)	197.95 ± 143.71	101.25 ± 9.25	**<0.001**

Laboratory Parameters

Inflammatory and coagulation markers (CRP, D-dimer, ferritin, IL-6, procalcitonin) showed significant derangements during hospital stay.

Table 4. Biochemical and haematological parameters

Variable	Survivors (n=219)	Expired (n=14)	*p* value
Sepsis, n (%)	3 (1.37)	3 (21.43)	**0.003**
Acute kidney injury, n (%)	2 (0.91)	2 (14.29)	**0.019**
TLC (cells/cmm), mean ± SD	9608.98 ± 5454.20	14118.36 ± 6343.63	**0.008**
Platelet count (×10³/cmm), mean ± SD	222.25 ± 112.46	142.55 ± 71.97	**0.038**
D-dimer (ng/mL), mean ± SD	63.41 ± 218.03	72.64 ± 158.02	**0.002**
Doxycycline use during hospitalization, n (%)	160 (73.06)	6 (42.86)	**0.028**
Ivermectin use during hospitalization, n (%)	151 (68.95)	5 (35.71)	**0.017**
Steroid use, n (%)	178 (81.28)	11 (78.57)	0.732

Treatment Patterns

Doxycycline, ivermectin and heparin were commonly prescribed. Systemic corticosteroids were used in 87.98% of patients.

Clinical Outcomes

Overall mortality was 6.01%, while 92.70% of patients were discharged. Oxygen supplementation was required in 72.96%. Sepsis and acute kidney injury were significantly associated with mortality.

FIGURES

Figure 1: Treatment interventions among hospitalised COVID-19 patients

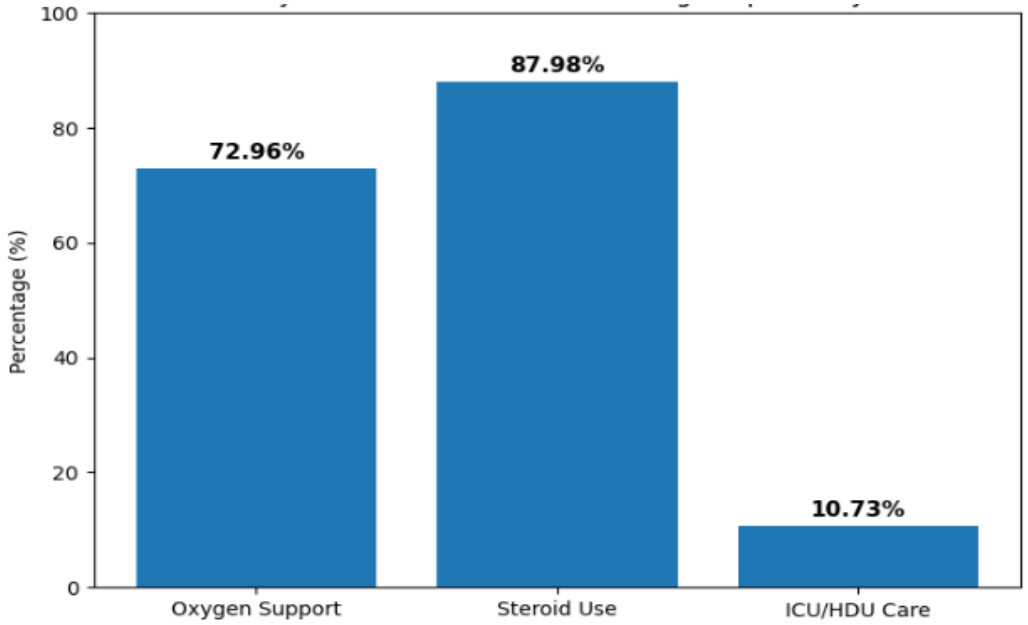


Figure 2: Vaccination status of the study population

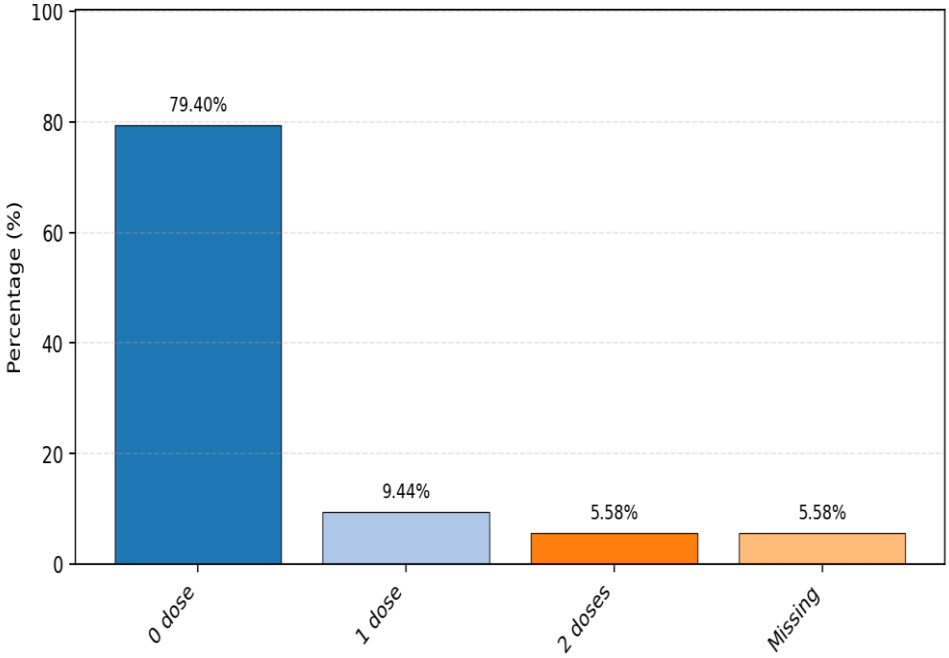
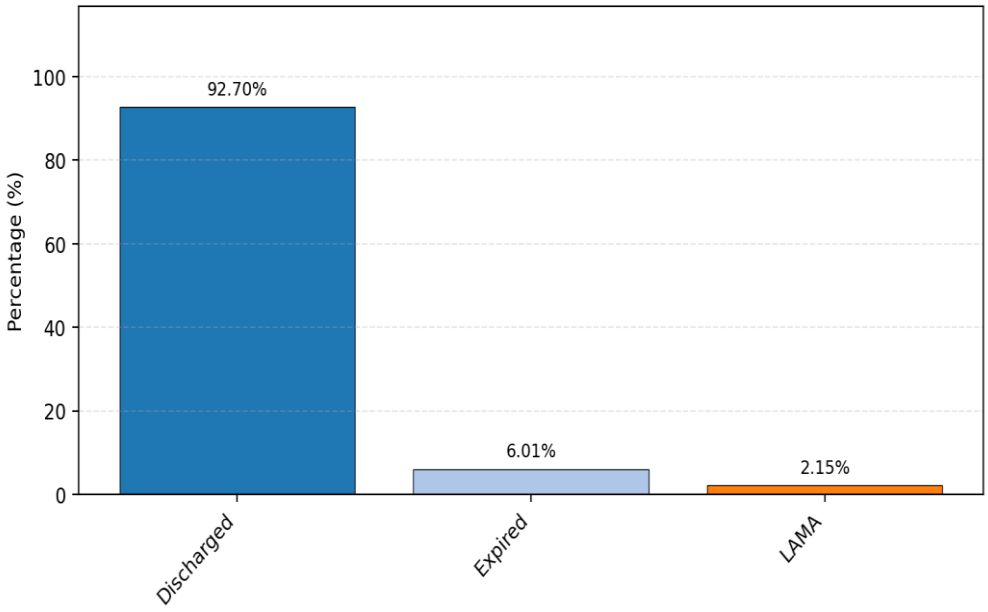


Figure 3: In-hospital clinical outcomes



DISCUSSION

This multicentric observational study provides robust real-world evidence on treatment patterns and outcomes among hospitalised COVID-19 patients in eastern India. The observed mortality of 6.01% was lower than early pandemic reports [6–8], likely reflecting improved supportive care, oxygen availability and adherence to evidence-based therapy.

The association of corticosteroid use with improved survival aligns with global evidence supporting their use in hypoxaemic COVID-19 [14–16]. Conversely, sepsis and acute kidney injury emerged as strong predictors of mortality, emphasising the need for early recognition and aggressive management. The high proportion of unvaccinated patients highlights the protective role of vaccination in reducing disease severity and hospitalisation.

Recommendations (Policy-Relevant)

1. Strengthen early oxygen-delivery systems and escalation protocols at secondary and tertiary facilities.
2. Ensure protocol-driven, judicious use of systemic corticosteroids in hypoxaemic patients.
3. Implement early screening and management pathways for sepsis and acute kidney injury.
4. Intensify vaccination outreach to reduce hospitalisation and severe disease burden.
5. Use real-world multicentric data to guide state-level pandemic preparedness and resource allocation.

CONCLUSION

Treatment patterns, vaccination status and key clinical parameters significantly influenced outcomes among hospitalised COVID-19 patients. Evidence from this multicentric study supports rational pharmacotherapy, timely oxygen supplementation and steroid use to reduce mortality and informs health-system policy and preparedness.

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Conflict of Interest: None declared.

Data Availability: Data are available from the corresponding author upon reasonable request.

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