

Original Research Article

Eastern India's response to the pandemic: a comparative assessment of West Bengal, Bihar, and Odisha

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ABSTRACT

Background: The three eastern states of India (Odisha, Bihar, and West Bengal) share common borders with similar cultural and socio-demographic characteristics due to historical ties. In the recent past, these states witnessed large-scale return migration of workers, leading to increasing numbers of COVID-19 cases. Despite the increasing number of cases, the testing capacity in Odisha, Bihar, and West Bengal is significantly lower compared to the testing capacities in the western, southern, and northern regions.

Methods: This study utilized a nine-month retrospective longitudinal design, focusing on the COVID-19 situation and healthcare facilities in Odisha, West Bengal, and Bihar from May 2020 to January 2021. Data were extracted from various Government and research institution websites, and descriptive analyses employed bar and line diagrams.

Results: Odisha and Bihar show declining COVID-19 cases, deaths, and test positivity rates, while West Bengal is on the rise. Testing rates are consistently increasing in all three states. West Bengal has the highest doctors per million, Odisha has the most nurses per million, and more pharmacists are registered in West Bengal. In health infrastructure, Odisha has COVID-19 special hospital testing centers, while West Bengal leads in hospital beds and ICU beds.

Conclusions: The burden of COVID-19 infection in India was heterogeneous, with evidence of high transmission in the eastern, northeast, western, and southern regions. The study findings will be helpful in making informed decisions about the current state-wise health status in eastern India.

Keywords: Bihar, COVID-19, Odisha, SARS, West Bengal

INTRODUCTION

India, the world's second-most populous nation, holds a critical position in the Asia Pacific region. An uncontrolled pandemic in India could affect nearly one-sixth of the world's population, making investigating COVID-19 patterns and predictions for the country imperative. Given the unknown transmission processes, high infection rates, and reliance on observational data for

containment, extensive control measures were initiated across India's central, state, district, and local levels, where over 1.3 billion people faced COVID-19 risks.¹

The initial COVID-19 case in India was reported in Kerala on January 30, 2020, with two more cases in March.² Several interventions were proposed by the Ministry of Health and Family Welfare, including social distancing. Subsequently, a nationwide Janata curfew was endorsed on March 22, 2020, followed by a 21-day

lockdown on March 24, later extended multiple times.³ The Epidemic Disease Act of 1897 was invoked to bolster these measures.

The eastern Indian states of Odisha, West Bengal, and Bihar, with the 5th-ranked GDP among Indian administrative regions,⁴ experienced a surge in COVID-19 cases in mid-May 2020 due to the return migration of workers. Despite the rising caseload, their testing capacity lagged other regions significantly. This study analyzed and compared COVID-19 indicators in these states, revealing variations in cases, deaths, and recoveries, possibly due to varying health system preparedness.

METHODS

This study employed a quantitative approach, analyzing numeric COVID-19 data, including confirmed cases, active cases, recovered cases, deaths, and RT-PCR tests. Various healthcare metrics were examined, such as the number of health workforce, beds, testing facilities, and ICU beds.

A comprehensive systematic literature search was conducted using online data search engines, including PubMed, Web of Science, and Google Scholar, along with consultation with Government Health Portals for West Bengal, Odisha, and Bihar states. Real-time COVID-19 websites, such as <http://covid19india.org/> and <https://covidwarriors.gov.in/default.aspx>, were also utilized to obtain up-to-date data.

The search employed keywords and phrases like "West Bengal, Odisha, and Bihar," "COVID-19," "2019-nCoV," "SARS CoV-2," "COVID-19 AND Recovery rate," "COVID-19 AND Fatality rate," "COVID-19 AND Hospital capacity," "COVID-19 AND Health Workforce," "COVID-19 AND Hospital beds," "COVID-19 AND ICU beds," and "COVID-19 AND comparative study."

The inclusion criteria consisted of randomized trials, meta-analyses, and systematic reviews, while case reports, editorials, and cohort studies were excluded. The search was limited to studies published in the English language, aiming to retrieve scientifically rigorous literature for the analysis of COVID-19 data in the specified regions.

Study design

A retrospective longitudinal design was utilized to analyze historical COVID-19 data from May 2020 to January 2021 in three Indian states.

Study settings

Data from the eastern states of West Bengal, Bihar, and Odisha were analysed. Each state served as a unit of analysis for multiple variables.

Data collection source

Data was retrieved from public domain sources, including official COVID-19 websites, government health portals, and publications by health authorities.

Data collection tools

Data was collected using two abstraction forms, state-wise and month-wise, detailing COVID-19 metrics. The forms were manually filled and later transferred to Microsoft Excel for analysis.

Data analysis

Descriptive statistics, including tables and trend analysis, were used to analyse COVID-19 cases, deaths, positivity rates, and healthcare facilities. Trend lines were plotted to represent week-wise data.

RESULTS

COVID-19 cases, deaths, and testing

As of January 31, 2021, West Bengal had the highest COVID-19 cases among the eastern Indian states, with 5.69 lakh confirmed cases. Odisha reported 3.35 lakh cases, while Bihar had 2.60 lakh cases, making it the lowest among the three states. Odisha initially had higher weekly cases, but West Bengal and Bihar stabilized. Odisha showed fluctuating trends over time (Figure 1).

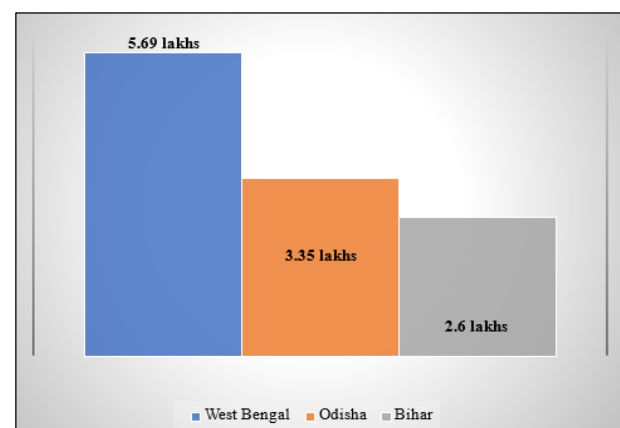


Figure 1: COVID-19 cases as of 31st January 2021.

West Bengal reported 10,173 COVID-19 deaths by January 31, 2021, whereas Odisha and Bihar reported 1,959 and 1,501 deaths, respectively. Odisha rose after the 7th week, while Bihar gradually decreased after the 8th. West Bengal's trend remained higher. By January 31, 2021, West Bengal conducted 7.99 million COVID-19 tests, Odisha conducted 7.7 million, and Bihar conducted 21.02 million. Odisha and West Bengal showed similar patterns, resembling a standard curve, while Bihar exhibited a different trend.

Healthcare facilities for COVID-19 management

In terms of healthcare professionals, West Bengal had 60,579 registered doctors, Odisha had 18,944, and Bihar had 34,193. For nurses, Odisha had 65,741, West Bengal had 59,705, and Bihar had 30,143. West Bengal had 89,630 pharmacists, Odisha had 32,386, and Bihar had 24,341. Infrastructure for COVID-19 management included 2,501 hospitals in Odisha, 2,263 in West Bengal, and 3,034 in Bihar. Odisha had 57.269 hospitals per million population, West Bengal had 23.352, and Bihar had 25.384 (Figure 2).

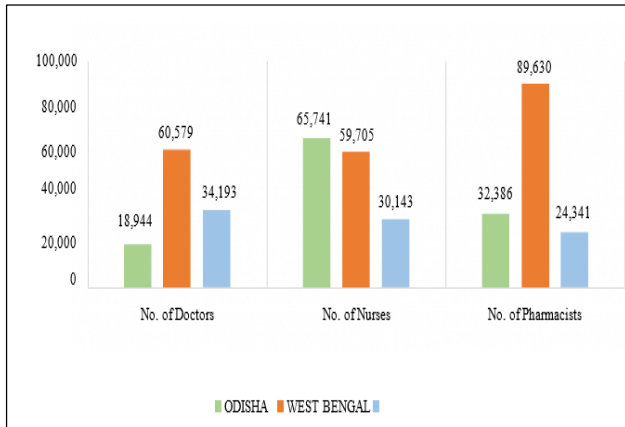


Figure 2: State-wise human resources for health for COVID-19 management.

For COVID-19 testing centres, Odisha had 764, West Bengal had 1,299, and Bihar had 355. Per million population, Odisha had 17.4, West Bengal had 13.4, and Bihar had 2.97. Regarding hospital beds for COVID-19 management, West Bengal had the highest with 1,13,535 beds, making it 1,171 beds per million populations. Odisha had 25,650 beds (587 beds per million), and Bihar had 30,857 beds (258 beds per million). In terms of ICU beds, Odisha had 1,285, West Bengal had 7,769, and Bihar had 1,807 ICU beds for COVID-19 management (Figure 3).

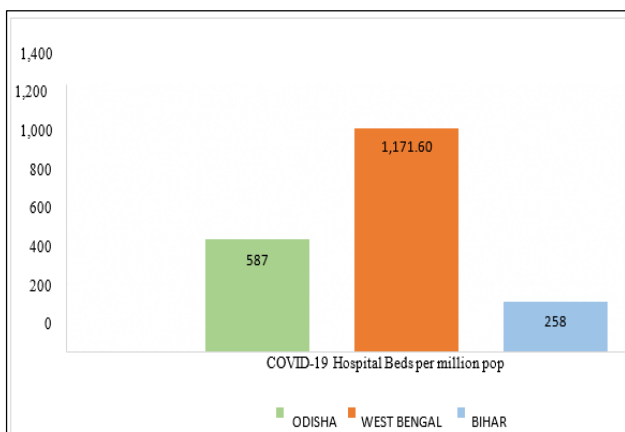


Figure 3: Infrastructure for management of COVID-19/ 100,000 population.

DISCUSSION

This study delves into the 9-month COVID-19 trajectory in three eastern Indian states: Odisha, West Bengal, and Bihar (May 2020 to January 2021). West Bengal reported the highest cases, followed by Odisha and Bihar. Odisha initially faced fewer cases but witnessed cluster formations by July 2020 due to returning migrants. Bihar struggled with over 30 million people below the poverty line due to limited testing centres and a healthcare infrastructure gap.⁵ In West Bengal, cases peaked in November 2020, followed by a continuous decline. By June, the Odisha government began to arrange special transportation facilities for returning migrants, and as a result of this, there was a rise in the number of cases reported.⁶

Deaths in Odisha rose till mid-October 2020, then declined.⁷ West Bengal's mortality rate decreased since December 2020, while Bihar maintained a low fatality rate till October 2020, after which it increased.⁸ Testing patterns varied: Odisha and Bihar significantly increased testing, while West Bengal faced criticism for low initial testing numbers. Odisha initially had the least test positivity rate but saw a significant rise later.

Regarding healthcare facilities, Odisha had the most COVID-19 hospitals, while West Bengal led in hospital beds and ICU beds per population. All states had limited doctors for COVID-19 management, with West Bengal having slightly more. Odisha stood out with many nurses, while West Bengal and Odisha had abundant pharmacists compared to Bihar. Testing capacity improved, but challenges remained, reflecting the intricate interplay between healthcare access, resources, and pandemic response strategies.

A significant limitation of this study stemmed from the inconsistencies in data availability related to COVID-19 and healthcare facilities within each state. The lack of a standardized and systematic approach to maintaining data on healthcare resources and personnel for managing COVID-19 posed a challenge.

This study offers crucial insights into how Eastern Indian states managed the COVID-19 pandemic from May 2020 to January 2021. It examines case trends, test positivity and death rates, aiding state health authorities in revising guidelines and policies. The research also details state-specific COVID-19 resources, empowering health authorities to optimize healthcare resources effectively.

CONCLUSION

The global pandemic has underscored the urgent need for robust healthcare infrastructure worldwide. Despite making strides in healthcare, India faces challenges with infectious diseases, non-communicable diseases, and the COVID-19 pandemic. Health analysts point out India's shortage of facilities, medical staff, and resources to

handle such crises. Increasing public health investment to at least 6% of GDP, prioritizing preventive and curative measures, and enhancing public-private partnerships are crucial. Southern states of India, with established healthcare systems, navigated the pandemic more effectively, highlighting the significance of robust public health infrastructure.

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Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Ghosh K, Sengupta N, Manna D, De SK. Inter-state transmission potential and vulnerability of COVID-19 in India. *Prog Disaster Sci.* 2020;7:100114.
2. Andrews MA, Areekal B, Rajesh KR, Krishnan J, Suryakala R, Krishnan B, et al. First confirmed case of COVID-19 infection in India: A case report. *Ind J Med Res.* 2020;151(5):490.
3. Bureau O. 'PM Modi calls for "Janata curfew" on March 22 from 7 AM-9 PM', *BusinessLine*. Available at: <https://www.thehindubusinessline.com/news/pm-modi-calls-for-janta-curfew-on-march-22-from-7-am-9-pm/article62220653.ece>. Accessed 18 October 2023.
4. StatisticsTimes.com. 'GDP of Indian states. Available at: <https://www.statisticstimes.com/economy/india/indian-states-gdp.php>. Accessed 18 October 2023.
5. World Bank. 'Overview'. Available at: <https://www.worldbank.org/en/topic/poverty/overview>. Accessed 18 October 2023.
6. Mohapatra RK, Das PK, Kandi V. Challenges in controlling COVID-19 in migrants in Odisha, India. *Diabetes Metab Syndr.* 2020;14(6):1593-9.
7. The Times of India. 'Odisha: Covid cases, deaths decline sharply', January 24, 2021. Available at: <https://timesofindia.indiatimes.com/city/bhubaneswar/odisha-covid-cases-deaths-decline-sharply/articleshow/80433385.cms>. Accessed 18 October 2023.
8. Banaji M. 'Bihar's COVID-19 epidemic is not over – but where is it, exactly?-the wire science'. Available at: <https://science.thewire.in/health/bihar-covid-19-epidemic-cases-rapid-antigen-tests-positivity-death-surveillance-urbanisation-elections/>. Accessed 18 October 2023.

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