

The Impact, Spreading, Analyzing & Treatment of Corona Virus (COVID-19) In India

Vishvajit S Gaikwad¹; Vinayak k Prasad²; Pankaj A Chavan³; Aditi K Mane⁴; Asawe Tejaswini Lalchand⁵
^{1,2,3,4,5}Department of Pharmacy, Siddhi's Institute of Pharmacy, DBATU University, Nandgaon, Murbad, Thane-421401.

Abstract:- A virus who's spread in overall world in Dec. 2019. That is Corona Virus. A novel corona virus was identified as causative acute. That virus spread from the China's Wuhan city, that mean corona was entered in INDIA from the China. The First patient of that virus was found in Kerala city. Overall countries effected by corona tried to different methods of prevention in their own way, some of them have been useful and some have been not useful and India excelled in treatment of spread of covid - 19 disease considering, Our country's demographic and socio-economic conditions the epidemic was delt with better than many. We performed a paper who described existing literature about covid virus disease 2019 history.

Keywords:- Impact; Spreading; Analyzing And Treatment.

I. INTRODUCTION

CORONA get occurs in China and spread globally caused by increased travel and globalization (1,2) . The afflicted countries include USA, Russia, and UK, with India having the third-highest confirmed cases. (1,3) COVID-19 is more worst affected on the India, with over 2.3 million cases and 46,188 deaths as of August 10, 2020. The country has seen a steady rise in cases, with the second million cases reported just three weeks after the first million.(3) States account for a significant portion of the total cases and deaths. Rural areas in India are emerging as new hotspots for COVID-19, with many cases reported in districts across the country.

The government of India has initiated various relief packages and initiatives to combat the COVID-19 crisis, including monetary relief packages and employment schemes. The country faces twin crisis of public health and economic downturn, exacerbated by a massive migrant workers crisis. Successful containment of the virus has been seen in some regions, such as Kerala, Bhilwara . and Dharavi, and these strategies can be 0%..w elsewhere. (3,5). Initially,including India. 1st patient of CORONA in our country was proclaimed in Kerala on 30 Jan 2020,

II. STEPS OF SPREADING

A. Early Spread (January2020 -March 2020):

Initial spread of CORONA India was slow, with only a few cases reported in January and February 2020. the virus had widen multiple states, including Maharashtra, Delhi, and Uttar Pradesh. (11,12)

B. International Travel and Importation (March 2020):

As people traveled internationally, the virus was imported into India, leading to an increase in cases. The government responded by imposing travel restrictions and quarantining travelers. (13)

C. Community Transmission (April 2020):

By April 2020, community transmission began to occur, where people were infected without known exposure to a confirmed case. This marked a significant turning point in the pandemic in India. (13)

D. Lockdown and Containment (April-May 2020):

Lockdown was extended several times, with gradual relaxations introduced in May 2020. (14)

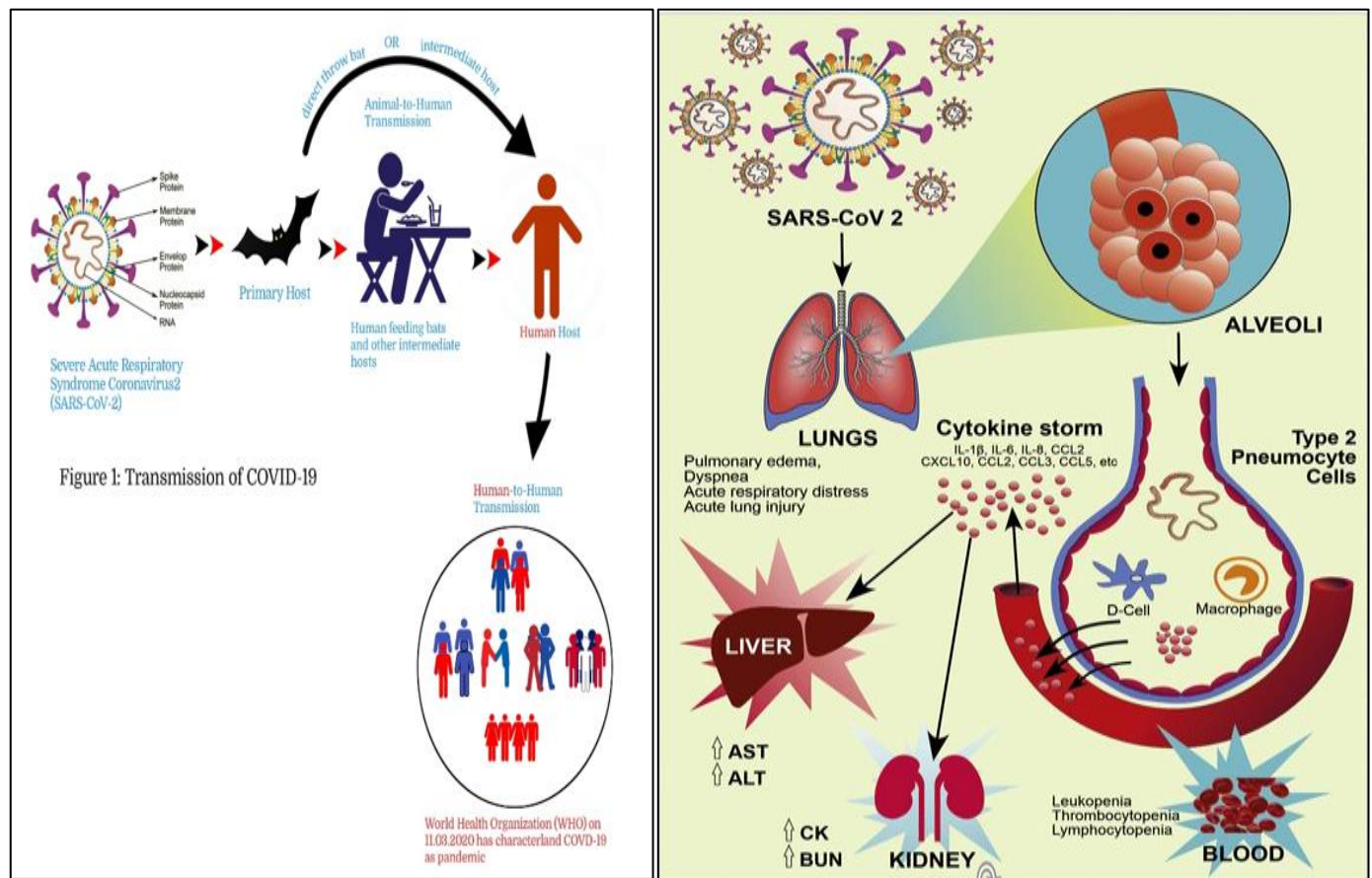
E. Spread to Rural Areas (May-June 2020):

As the lockdown was relaxed, the virus spread to rural areas, where healthcare infrastructure is limited. This posed a significant challenge to the public health response. (15)

F. Factors Contributing to Spread:

➤ Several Factors Contributed to the Spread of CORONA, Including:

- Importation
- Community transmission
- Density of population
- Limited public health infrastructure
- Delayed response
- Mutations and variants



➤ Stages:

The spread of COVID-19 in India can be divided into several stages, including:

- Index case
- Local transmission
- Community transmission
- Epidemic
- Pandemic
- Re-emergence
- Endemic

➤ Government Feedback:

- Imposing travel restrictions and quarantining travelers
- Implementing lockdowns and containment measures
- Scaling up testing and contact tracing
- Strengthening healthcare infrastructure (16,17)

✓ Stage 1: Index Case (0-14 Days)

- First case reported in a new area
- Virus introduced through travel or contact with infected Person.

✓ Stage 2: Local Transmission (14-28 Days)

- Virus spreads to close contacts and family members
- Small clusters of cases emergency

✓ Stage 3: Community Transmission (28-42 Days)

- Virus spreads beyond close contacts to wider community
- Cases increase exponentially
- Community-wide outbreaks occur

✓ Stage 4: Epidemic (42-56 Days)

- Widespread transmission in multiple areas
- Large numbers of cases and hospitalizations
- Healthcare system starts to get overwhelmed

✓ Stage 5: Pandemic (Beyond 56 Days)

- Virus spreads globally, affecting multiple countries and regions
- Worldwide outbreaks and surges in cases
- Global healthcare systems and economies impacted.

➤ Additional Stages:

- Re-emergence: Cases reappear after a decline, often due to relaxation of public health measures or new variants.
- Endemic: Virus becomes established in a population, with ongoing transmission and periodic surges.

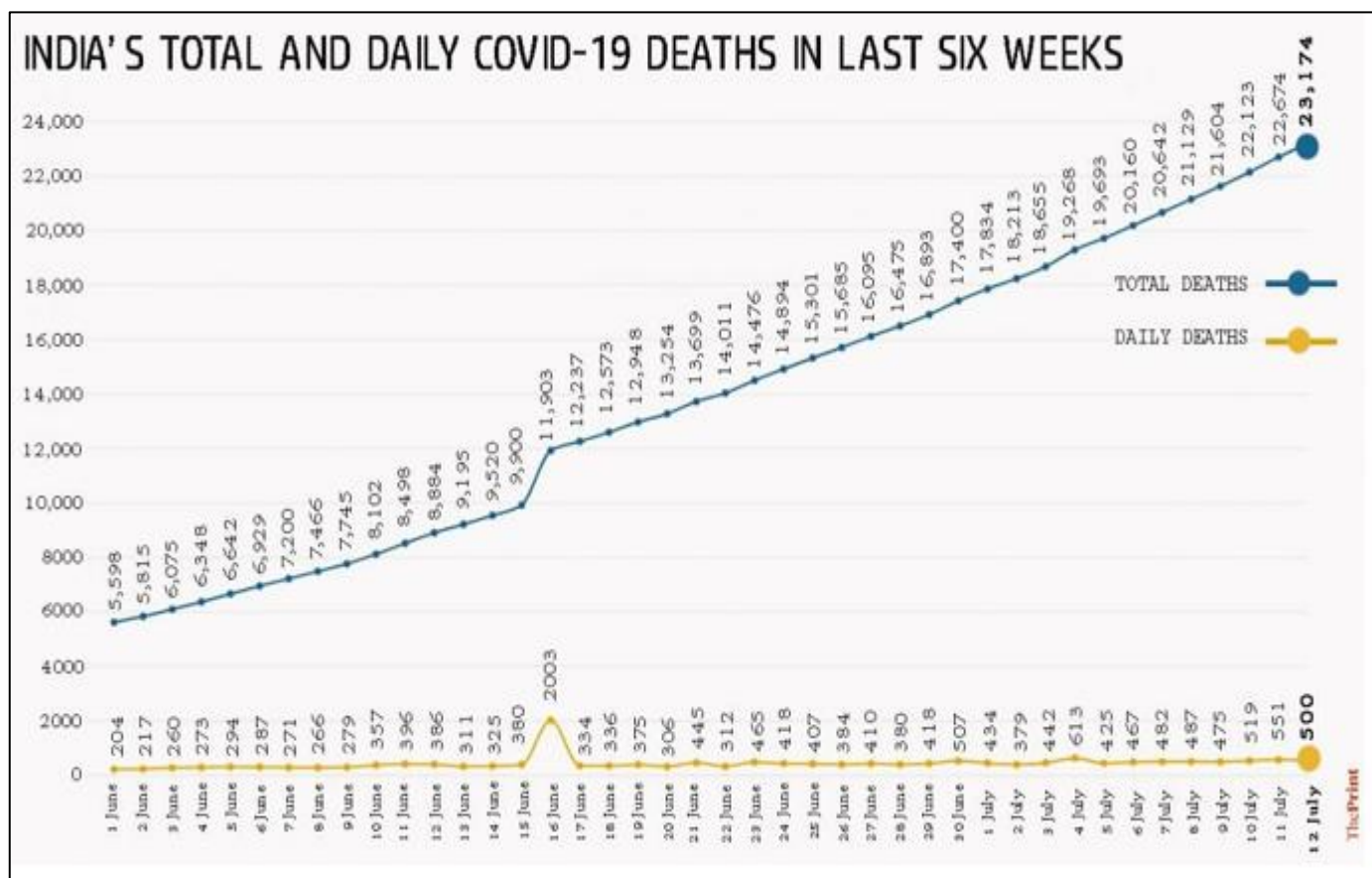


Fig 2: India's total and daily corona patient's deaths in last six weeks (12 June to 12 July)

III. IMPACT

Economic Impact: The pandemic induce to afflicted on India's GDP growth rate, with estimates ranging from -4.3% to -15% ². The lockdowns and social distancing measures affected businesses, especially micro and small enterprises, resulting in job losses and economic hardship. (21,22) The agriculture sector was also impacted, lack of market demand and poor demand.

Healthcare Impact: The pandemic overwhelmed India's healthcare system, with shortages of medical supplies, hospital beds, and staff ¹. The government had to set up makeshift hospitals and deploy medical teams to affected areas(23)

➤ *Social Impact:*

The pandemic had a significant social impact, with widespread disruptions to daily life, social distancing measures affecting social and cultural events, and mental health concerns due to isolation and fear (24)¹. The lockdowns and travel restrictions also affected education, impacting over 300 million students.(24)

➤ *Here are Some Topics that Affect the Coronavirus Situation in India: (25)*

- Density and Urbanization:
- Healthcare Infrastructure.
- Economic Factors.
- Migration and Mobility .
- Government Policies and Response .
- Public Awareness and Behavior .
- Vaccination and Immunization.
- Mutations and Variants.
- Seasonality and Climate.
- Comorbidities and Pre-existing Conditions .
- Testing and Contact Tracing .
- Social and Cultural Factors.

State	City	COVID/100,000 population	Parks/100,000 population	Persons/allopathic bed
Karnataka	Bengaluru	875	10	120
Maharashtra	Mumbai	4,166	1.7	1,053
Tamil Nadu	Chennai	2,459	5.5	1,028
Madhya Pradesh	Bhopal	343	3	1,117
Bihar	Patna	272	2.5	813
Gujarat	Surat	271	2.3	2,158
Andhra Pradesh	Vizag	545	6	791
Karnataka	Mangalore	401	4	518
Karnataka	Mysore	309	53	583
Karnataka	Belgaum	146	1.8	490
Karnataka	Shimoga	205	14	323
Karnataka	Bellary	532	19	294
Karnataka	HDMC	387	5	581
Karnataka	Davanagere	244	24	458
Karnataka	Gulbarga	325	19	5,431
Karnataka	Bijapur	47	1.6	1,162
Karnataka	Bidar	196	53	154
Karnataka	Chikmagalur	179	105	296
Karnataka	Chitradurga	84	4	359
Karnataka	Raichur	246	22	195
Karnataka	Udupi	637	3	580

Fig 3: Record of corona patients in India

➤ *To Address these Challenges, India needs to Invest in:*

Expanding hospital capacity and equipment. Recruiting and training more healthcare professionals.(29) Improving access to diagnostic facilities and testing. Strengthening supply chain management. Enhancing data management and surveillance systems. Increasing funding for healthcare infrastructure. Implementing emergency preparedness plans. Improving healthcare infrastructure in rural and tribal areas. Increasing availability of specialized care Implementing effective waste management and infection control practices.(29)

➤ *Economics Factors*

India's economy put up with a historic 7.3% contraction in the April-June. the worst decline since quarterly GDP records began in 1996. Additionally, the COVID-19 lockdown cause a massive departure of 10 million workers returning to their native places, yet neither the central nor state governments had data on the number of moving workers who mislaid their works or lives time of this period, highlighting a significant gap in data collection and support for vulnerable populations.(30) The Indian government extended help to migrant workers and established a digital database during the second COVID-19 wave, but the economy suffered significantly. The lockdown shuttered most

sectors, except agriculture, leading to a projected GDP contraction of over 8% in April-June. The informal sector was severely hit, and private consumption and investments, key drivers of growth, were impacted. Unemployment rates rose to 7.9-12% in April-June, and millions of jobs were lost permanently, dampening consumption.(30,31)

➤ *India's GDP Growth Suffered a Significant Decline due to the COVID-19 Lockdown, with a:*

- 23.9% crash in GDP growth rate immediately following the lockdown
- Projected GDP growth rate now likely below 10% for the current year

➤ *Hospitality Sector (India) (33,34)*

Comprising businesses like restaurants, hotels, and nightclubs, is facing a severe crisis due to localized lockdowns and restrictions imposed by states to combat the CORONA pandemic. This field, which significantly contributes to annual GDP. That is experiencing repeat of 2020's economic downturn. The restrictions and curfews have resulted in:

- Reduced footfall and sales
- Forced closures of many businesses
- Significant financial losses
- Impact on employment and livelihoods

The sector is struggling to recover from the previous year's losses and is now facing another wave of disruptions, highlighting the need for government support and relief measures to mitigate the economic impact.

➤ *The Tourism Sector in India*

- Significant financial losses
- Widespread job losses
- Struggles to recover from initial losses suffered in 2020
- Long-term impact on the sector's growth and development

The sector's struggles will have a ripple effect on the overall economy, highlighting the need for government support and initiatives to revive the tourism industry.(36)

➤ *India's Fiscal Deficit*

That was impacted by the CORONA prevalent, with:

- Fiscal deficit rising 2020-21 from 9.5% of GDP (from 3.5% projected)
- 2021-22 target set at 6.8%

Despite the pandemic, the government is committed to achieving its fiscal deficit targets. (37,38).

➤ *Public Awareness and Behavior*

Impact on public awareness and behavior, as evident from literature. Increased health awareness: Studies have shown a significant increase in public awareness about health and hygiene practices, such as hand washing and mask-wearing.(21) Behavioral changes: Research has documented changes in social behavior, including reduced gatherings, increased distancing, and improved compliance with public health measures. Mental health awareness: The pandemic has raised awareness about mental health and well-being, with increased focus on stress management and emotional support. Literature has highlighted the growth of community solidarity, with increased volunteerism and support for affected individuals. Economic awareness. (40) The pandemic has raised awareness about economic vulnerabilities and the importance of financial preparedness (21).

IV. ANALYZING

A. *The Virology*

In human, coronavirus is attack on nose, throat and sinus cavity. Virus at the helm for global, is a member of the Corona virus family and has a single-stranded RNA genome. The viral particle consists of a lipid bilayer envelope, spike proteins, and a nucleobase. (41) primarily found in lungs, kidneys, and other organs. Upon entry, the virus releases its RNA genome, which is replicated in the cytoplasm using host

cell machinery. New virions are assembled and released, spreading to other cells and tissues. (42) Virus's replication cycle involves multiple stages, including attachment, penetration, uncoating, transcription, translation, and release. Understanding these processes is crucial for developing effective antiviral therapies. The virus triggers a robust immune response, but can also evade immune detection through various mechanisms (41)

The virology of CORONA has significant inference for public health, vaccine growth, and treatment strategies. Ongoing research focuses on understanding the virus's transmission dynamics, viral load, and shedding patterns to inform control measures. Furthermore, studies on the virus's genetic diversity and evolution will help predict future outbreaks and inform vaccine design. Elucidating the virology of CORONA is vital for combating the widespread and preparing for future viral threats.(41)

B. *Epidermiology*

- 1st case reported in China and start to spread from one to another because that is infectious disease.
- Person through person transmission through respiratory droplets, contact, and fomites
- Basic reproduction number (R0) estimated to be 2-2.5, indicating moderate to high transmissibility (23)

C. *Clinical Features:*

- Incubation period: 14 days, with minimum of 5-6 days.

➤ *Symptoms:*

- Mild: fever, cough, fatigue, headache, sore throat
- Moderate: pneumonia, shortness of breath, chest tightness
- Severe
- Respiratory failure
- Cardiac injury
- Acute kidney injury
- Secondary infections

➤ *Laboratory Findings:*

- RT-PCR or serological tests for diagnosis
- CBC may show lymphopenia, thrombocytopenia

D. *Prevent:*

Vaccination is a critical component of India's COVID-19 prevention strategy. The country has approved several vaccines, including Covishield, Covaxin, and Sputnik V, and has launched a nationwide vaccination program. Travel restrictions, and lockdowns, have also been implemented to reduce transmission. The government has initiated several schemes, (42)

Here are the stages of COVID-19 vaccination in India

➤ *Stage 1: Trial and Approval (January 2020 – January 2021)*

- Drugs Controller General of India permitted vaccines for emergency use : Covaxin (Bharat Biotech) and Covishield (Oxford-AstraZeneca). (15)

➤ *Stage 2: Healthcare Worker Vaccination (January 16, 2021 – February 2021)*

- Vaccination drive began with healthcare workers (approximately 30 million)
- Covishield and Covaxin were administered in a phased manner

➤ *Stage 3: Frontline Worker Vaccination (February 2021 – March 2021)*

- Vaccination expanded to frontline workers (approximately 20 million)
- Included police personnel, armed forces, and other essential services staff.

➤ *Stage 4: 60+ Age Group Vaccination (March 1, 2021 – April 2021)*

- Vaccination opened for citizens above 60 years (approximately 100 million)
- Co-morbidities in 45-59 age group also included

➤ *Stage 5: 45-59 Age Group Vaccination (April 1, 2021 – May 2021)*

- Vaccination expanded to 45-59 age group (approximately 150 million)
- Co-morbidities included in this age group

➤ *Stage 6: 18-44 Age Group Vaccination (May 1, 2021 – Present)*

- Vaccination opened for all citizens above 18 years (approximately 600 million)
- Vaccination drive continues with increased pace and coverage

E. Treatment

- Mild cases: Home isolation, rest, hydration, and symptomatic treatment (e.g., antipyretics, antitussives).
- Moderate cases: Hospitalization, oxygen therapy, antiviral medications (e.g., Oseltamivir, Lopinavir/Ritonavir), and corticosteroids.
- Severe cases: ICU admission, mechanical ventilation, and immunomodulators (e.g., Tocilizumab).
- Investigational treatments: Remdesivir, Hydroxychloroquine, and Convalescent Plasma Therapy.
- Supportive care: Management of comorbidities, nutritional support, and psychological counseling. (44)

V. CONCLUSION

The CORONA prevalent has get totally disturbed economy, society and health care system. While the country has made significant strides in vaccination and treatment efforts, the impact of the pandemic has been substantial. Ongoing research, adaptability, and a coordinated response will be crucial in mitigating the effects of CORONA in India. By analyzing impact and treatment of CORONA, we can identify areas for improvement and work towards building a more resilient healthcare system, ultimately saving lives and promoting a speedy recovery from this global health crisis.

REFERENCES

- [1]. World Health Organization (2020) Director-General's remarks at the media briefing on 2019-nCoV on 11 February 2020.
- [2]. Bengesi, S., El-Sayed, H., Sarker, M. K., Houkpati, Y., Irungu, J., & Oladunni, T. (2024). Advancements in Generative AI: A Comprehensive Review of GANs, GPT, Autoencoders, Diffusion Model, and Transformers. *IEEE Access*.
- [3]. Kumari, Rajani, et al. "Analysis and predictions of spread, recovery, and death caused by COVID-19 in India." *Big Data Mining and Analytics* 4.2 (2021): 65-75.
- [4]. Bhatnagar, Vaibhav, et al. "Descriptive analysis of COVID-19 patients in the context of India." *Journal of Interdisciplinary Mathematics* 24.3 (2021): 489-504.
- [5]. Asirvatham, Edwin Sam, et al. "Who is dying from COVID-19 and when? An Analysis of fatalities in Tamil Nadu, India." *Clinical Epidemiology and Global Health* 9 (2021): 275-279.
- [6]. Shi, Yu, Gang Wang, Xiao-peng Cai, Jing-wen Deng, Lin Zheng, Hai-hong Zhu, Min Zheng, Bo Yang, and Zhi Chen. "An overview of COVID-19." *Journal of Zhejiang University. Science. B* 21, no. 5 (2020): 343.
- [7]. Ciotti, M., Ciccozzi, M., Terrinoni, A., Jiang, W. C., Wang, C. B., & Bernardini, S. (2020). The COVID-19 pandemic. *Critical reviews in clinical laboratory sciences*, 57(6), 365-388.
- [8]. David, M., P. Lokeshkumar, and S. D. Suraj. "Covid-19 (coronavirus): A global emergency outbreak and its implications in India." *Escors D, Ortego J, Enjuanes L* (2020).
- [9]. David, M., P. Lokeshkumar, and S. D. Suraj. "Covid-19 (coronavirus): A global emergency outbreak and its implications in India." *Escors D, Ortego J, Enjuanes L* (2020).
- [10]. ANWAR, A., CHANDEL, V. S., SINGH, S. P., & Anwar, N. (2021). Rise and fall in sars-cov-2 global pandemic strain rate—an overview. *Int. J. Appl. Pharma*, 46-67.
- [11]. Grid COVID-19 Study Group. (2020). Combating the COVID-19 pandemic in a resource-constrained setting: insights from initial response in India. *BMJ global health*, 5(11), e003416.

- [12]. Grid COVID-19 Study Group. Combating the COVID-19 pandemic in a resource-constrained setting: insights from initial response in India. *BMJ global health*. 2020 Nov 1;5(11):e003416.
- [13]. Koopmans, Ruud. A virus that knows no borders? Exposure to and restrictions of international travel and the global diffusion of COVID-19. No. SP VI 2020-103. WZB Discussion Paper, 2020.
- [14]. Dev, S. Mahendra, and Rajeswari Sengupta. "Covid-19: Impact on the Indian economy." *Indira Gandhi Institute of Development Research, Mumbai April* (2020): 1-43.
- [15]. Tabish, S. A. (2021). India's Covid-19 Crisis: Challenges & Strategies. *International Journal of General Medicine and Pharmacy (IJGMP)* 10 (2021): 69-86. *International Journal of General Medicine and Pharmacy (IJGMP)*.
- [16]. Liu, Xiaoyue, et al. "The role of seasonality in the spread of COVID-19 pandemic." *Environmental research* 195 (2021): 110874.
- [17]. Saadat, S., Rawtani, D., & Hussain, C. M. (2020). Environmental perspective of COVID-19. *Science of the Total environment*, 728, 138870.
- [18]. Bajpai, Nirupam, and Manisha Wadhwa. COVID-19 in India: Issues, challenges and lessons. No. 34. *ICT India Working Paper*, 2020.
- [19]. Zirpe, K. and Gurav, S., 2022. COVID-19 pandemic in India. In *COVID-19 Pandemic* (pp. 205-210). Elsevier.
- [20]. Chaudhary, Rahul Kumar. "COVID-19 Pandemic Impact in India." (2020).
- [21]. Gopalan, Hema S., and Anoop Misra. "COVID-19 pandemic and challenges for socio-economic issues, healthcare and National Health Programs in India." *Diabetes & Metabolic Syndrome: Clinical Research & Reviews* 14.5 (2020): 757-759.
- [22]. Chauhan, Vinay, and Avantika Bakshi. "COVID-19 pandemic: Concerns, impact and continuity strategies for small businesses in India." *Indian Journal of Economics and Development* 17.3 (2021): 681-692.
- [23]. Lahariya, Chandrakant, Gagandeep Kang, and Randeep Guleria. *Till we win: India's fight against the COVID-19 Pandemic*. Penguin Random House India Private Limited, 2020.
- [24]. Dalal, P. K., Deblina Roy, Prashant Choudhary, Sujita Kumar Kar, and Adarsh Tripathi. "Emerging mental health issues during the COVID-19 pandemic: An Indian perspective." *Indian journal of psychiatry* 62, no. Suppl 3 (2020): S354-S364.
- [25]. Khandelwal, A., Agrawal, A., & Kumar, A. (2020). An outbreak of coronavirus (COVID-19) epidemic in India: challenges and preventions. *J Infect Dis Ther*, 8(421), 2.
- [26]. Sridhar, K. S. (2023). Urbanization and COVID-19 prevalence in India. *Regional Science Policy & Practice*, 15(3), 493-506.
- [27]. Hashim, S. R. (2020). Indian urbanisation—issues and challenges. *IASSI-Quarterly*, 39(3), 341-360.
- [28]. Rai, S. C., and Bahadur Shah Zafar. "Progress in Indian Geography." (2022).
- [29]. Tempe, D. K., Khilnani, G. C., Passey, J. C., & Sherwal, B. L. (2020). Challenges in preparing and managing the critical care services for a large urban area during COVID-19 outbreak: perspective from Delhi. *Journal of Cardiothoracic and Vascular Anesthesia*, 34(10), 2586-2594.
- [30]. Mishra AK, Rath BN, Dash AK. Does the Indian financial market nosedive because of the COVID-19 outbreak, in comparison to after demonetisation and the GST?. In *Research. on Pandemics* 2021 Nov 24 (pp. 30-48). Routledge
- [31]. Gulati, Ashok; Jose, Shyma; Singh, B.B. (2021). COVID-19: Emergence, spread and its impact on the Indian economy and migrant workers.
- [32]. Jena, Pradyot Ranjan, et al. "Impact of COVID-19 on GDP of major economies: Application of the artificial neural network forecaster." *Economic Analysis and Policy* 69 (2021): 324-339.
- [33]. Kumar, S. (2021). The effect of CORONA-COVID-19 on hospitality sector. *Journal of Statistics and Management Systems*, 24(1), 163-174.
- [34]. Kumar S. The effect of CORONA-COVID-19 on hospitality sector. *Journal of Statistics and Management Systems*. 2021 Jan 2;24(1):163-74.
- [35]. Kumar, Vineet. "Indian tourism industry and COVID-19: present scenario." *Journal of Tourism and Hospitality Education* 10 (2020): 179-185.
- [36]. Kumar, V. (2020). Indian tourism industry and COVID-19: present scenario. *Journal of Tourism and Hospitality Education*, 10, 179-185.
- [37]. Balajee, Anuragh, Shekhar Tomar, and Gautham Udupa. "Fiscal Situation of India in the Time of COVID-19." *Indian School of Business* (2020).
- [38]. Patnaik, Ila, and Rajeswari Sengupta. "Impact of Covid-19 on the Indian economy: An analysis of fiscal scenarios." *Indian Public Policy Review* 1.1 (Sep-Oct) (2020): 41-52.
- [39]. Kaushik, M., Agarwal, D., & Gupta, A. K. (2021). Cross-sectional study on the role of public awareness in preventing the spread of COVID-19 outbreak in India. *Postgraduate Medical Journal*, 97(1154), 777-781.
- [40]. Sornette, Didier, et al. "Interpreting, analysing and modelling COVID-19 mortality data." *Nonlinear dynamics* 101 (2020): 1751-1776.
- [41]. Imtyaz, A., Haleem, A., & Javaid, M. (2020). Analysing governmental response to the COVID-19 pandemic. *Journal of Oral Biology and Craniofacial Research*, 10(4), 504-513.
- [42]. Fragkou, Paraskevi C., et al. "Review of trials currently testing treatment and prevention of COVID-19." *Clinical Microbiology and Infection* 26.8 (2020): 988-998.
- [43]. Kumar, Velayudhan Mohan, et al. "Strategy for COVID-19 vaccination in India: the country with the second highest population and number of cases." *Npj Vaccines* 6.1 (2021): 60.
- [44]. Stasi, Cristina, et al. "Treatment for COVID-19: An overview." *European journal of pharmacology* 889 (2020): 173644.