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Term Paper

The COVID-19 pandemic has significantly impacted India's vast socio-economic landscape, presenting numerous challenges across healthcare, economic stability, and daily life. The overwhelmed healthcare systems faced shortages of medical resources amidst a surge in infections and fatalities. Economic repercussions led to widespread job losses, business closures, and increased poverty, particularly affecting marginalized communities reliant on daily wages. Educational disruptions from prolonged school closures exacerbated existing disparities. Despite these challenges, India demonstrated resilience through collective efforts, leveraging vaccination campaigns and innovative solutions. However, concerning budgetary allocations, health sector funding declined from 3.6% to 2.4% of the budget, impacting healthcare quality alongside a low doctor-to-patient ratio of 1:834. (*Demand for Grants 2023-24 Analysis : Health and Family Welfare*)

The Indian government responded with a coordinated plan, with ministries assuming specific roles. The Ministry of Home Affairs oversaw agencies like NDMA and NDRF for quarantine facilities and essential service continuity. The Ministry of External Affairs provided updates from affected countries and monitored travel restrictions. Ministries of Defence, Railways, and Civil Aviation supported healthcare infrastructure and travel protocols. Various ministries from Labour to Tourism contributed sanitation measures and research support, reflecting a comprehensive government approach.

India initiated a fully funded COVID-19 emergency response on April 7, 2020, strengthening national and state health systems through acquiring medical supplies, enhancing surveillance, and bolstering infrastructure. The Ministry of Health and Family Welfare allocated funds for dedicated COVID-19 hospitals, expanded facilities, and recruited personnel. Procurement of PPE and testing kits complemented community surveillance and public awareness campaigns. India committed to the COVID-19 Emergency Response project with international collaboration, prioritizing environmental standards and ongoing monitoring. Central directives urged states to enforce measures to curb virus spread and safeguard public health.

This paper examines the states of Kerala, Odisha, and Maharashtra, focusing on their public health and social welfare aspects. It explores the evolution of their policies following the virus outbreak and evaluates the effectiveness of these policies in containing the spread of the virus.

Kerala

Kerala, India's southernmost state with a population density of 859 people per square kilometer (*List of Districts of Kerala*)and a significant expatriate community, faced challenges during the pandemic due to its dense population and influx of returning expatriates from the Gulf. Despite this, Kerala managed the pandemic effectively with proactive interventions, resulting in high recovery rates, low mortality, and slow case progression. The success was attributed to surveillance, quality quarantine measures, robust testing strategies, continuous treatment services, community engagement,

proactive care for vulnerable populations, and educational campaigns promoting behavioral change. The state emphasized tracing, quarantine, testing, isolation, and treatment protocols. (*Epidemiology and Response to the COVID-19 Pandemic in Kerala, India, 2020–2021: A Cross-Sectional Study*, 2022) Kerala also extended welfare projects to its approximately 4 million interstate migrant workers during the pandemic.Historically, administrative reforms during the reigns of Travancore and Cochin rulers set benchmarks in health, education, and nutrition. Kerala's progressive legacy includes advancements in women's rights, influenced by its traditional matriarchal system governing family and inheritance practices. Women, particularly from middle and upper classes, have played vital societal roles, reflecting the belief that educating a woman educates a family. Missionaries contributed significantly to Kerala's education and healthcare sectors through schools, colleges, and hospitals, shaping the state's social and institutional fabric.

Public health

Kerala's public health sector, rooted in a historical legacy dating back to dynasty rule, maintains exceptional standards with 230 community health centers and 845 primary health centers, offering a ratio of one center per 30,000 people. The state boasts a high doctor-to-patient ratio of 42 per 1000 individuals, supported by female junior public health nurses and multi-purpose health workers (MPHWs). Accredited Social Health Activists (ASHAs) serve at a ratio of one per 1000 to 1500 population. (ministry of health and family welfare)

Following lessons from the Nipah virus outbreak, Kerala's containment strategies emphasize a robust primary healthcare system, active community involvement, and decentralized management integrated into a centralized epidemic control framework. Private hospitals were mandated to reserve beds for COVID-19 treatment, with early detection centers doubling as quarantine facilities.

Kerala's first COVID-19 case was reported in Thrissur on January 30, 2020. By April 5, 2022, Kerala recorded 6,534,352 confirmed cases with a 2.04% test positivity rate (cumulatively 13.96%). Out of these, 6,462,811 individuals (98.91%) recovered, while 68,197 (1.04%) died. (kerala govt) Kerala leveraged Ayurveda for immunity enhancement and adopted innovative technological measures like drone surveillance and geo-fencing for quarantine monitoring. Oxygen war rooms provided real-time data during the second wave, and the COVID-19 Jagrata portal offered bed availability updates, reflecting a proactive and tech-savvy approach.

Social Welfare

During the pandemic, the state has considered the welfare of people as a priority along with tackling the virus. The state has taken initiatives to provide free food kits, 3 meals a day for the households in need where they used a hub and spoke model for food distribution, FLCTs provided free meals to patients. The Kozhikode district in Kerala has

initiated the Udayam project (calicut district administration) which is one of a kind in India which provides a home for the destitute. The state provided free vaccination to its people on a priority basis. Each District Collector has received an allocation of Rs. 50 lakhs to conduct COVID-19 control and prevention activities within their respective districts. Financial assistance has also been extended to fishermen, artists, lottery agents and sellers, as well as to individuals caring for elephants and other animals. Furthermore, a Chief Minister's Helping Hand Loan Scheme worth Rs. 2000 crore was announced to aid those experiencing unemployment and hardships due to lockdown measures. This scheme will be implemented through local neighborhood groups under the umbrella of Kudumbasree(role of community and voluntary organizations), ensuring effective distribution and support to affected individuals.

Applying Kingdon's Multiple Streams Framework (MSF) to Kerala's COVID-19 journey reveals how the state effectively addressed the pandemic's challenges through a coordinated response. Kerala's prior experiences with health crises, such as Nipah outbreaks and severe floods, provided a foundation for preparedness. As COVID-19 cases surged, Kerala swiftly implemented innovative policies like the "Break the Chain" campaign for public awareness and community kitchens for food security. The convergence of rising COVID-19 cases (problem stream), proactive policy development (policy stream), and strong political leadership (political stream) created policy windows for decisive action. Kerala's success in managing the pandemic stemmed from coupling evidence-based policies with community engagement, demonstrating effective utilization of Kingdon's framework to navigate complex health challenges and mitigate the pandemic's impact.

Kerala vs centre in handling the pandemic

During the pandemic, the state employed effective policy tools, including widespread campaigns like "Break the Chain" and "SMS" (social distancing, mask, and sanitizer), reinforced by innovative measures like a police dance-drama video. Sanitizer dispensers in public spaces and sanitizer-dispensing robots encouraged behavioral change. Regulations under the Epidemic Diseases Act enforced strict social distancing, while home quarantine guidelines emphasized post-outing sanitization. The state set goals to contain test positivity rates and active cases.

Regular press briefings by the Chief Minister communicated effectively, setting standards for locally produced testing kits and PPEs and issuing guidelines under the Essential Commodities Act to prevent price hikes. Advisory committees informed decision-making, contributing to a comprehensive pandemic management approach.

Community education by Accredited Social Health Activists (ASHAs), self-help groups, and mass media campaigns emphasized preventive measures. The Collective for Open Data Distribution-Keralam launched a real-time COVID-19 dashboard. Policy challenges included logistical issues with testing, opposition to mandatory expatriate testing,

healthcare strain, inadequate home isolation, affordability, and economic repercussions, requiring adaptive management for returning residents and migrants.

Health expenditure post covid

Post the COVID-19 pandemic, a study conducted in Kerala revealed alarming figures regarding public health expenditure. The study found that 49.7% of households faced catastrophic health expenditures, with 32.9% resorting to distress financing to cover medical costs. Specifically, among patients treated in public sector institutions, 37.6% of households experienced catastrophic health expenditures, whereas the figure was higher at 64.3% for those treated in private sector hospitals. (*Financial Burden and Catastrophic Health Expenditure Associated With COVID-19 Hospitalizations in Kerala, South India*)

During the pandemic, the state employed a range of policy tools effectively. Campaigns like "Break the Chain" and "SMS" (social distancing, mask, and sanitizer) were widely promoted, with innovative approaches like a police dance-drama video reinforcing these messages. Sanitizer dispensers were strategically placed in public spaces, and robots dispensed sanitizers, encouraging behavioral change. Regulations under the Epidemic Diseases Act enforced strict social distancing norms, while home quarantine guidelines emphasized practices like sanitizing after outings. The state set goals to contain test positivity rates and active cases, using goal setting as a strategy.

Regular press briefings by the Chief Minister effectively communicated with citizens, establishing standards for locally produced testing kits and PPEs and issuing guidelines under the Essential Commodities Act to prevent price hikes on essential items like masks. Advisory committees informed decision-making. These measures collectively contributed to a comprehensive and proactive approach to managing the pandemic.

Community education by Accredited Social Health Activists (ASHAs), self-help groups, and panchayat leaders, alongside mass media campaigns, emphasized preventive measures. The Collective for Open Data Distribution-Keralam launched an online dashboard for COVID-19 cases, providing real-time analysis. The state used policy mixes, including fiscal, monetary, health, and social policies, with positive synergies.

Implementing policies faced challenges like logistical issues with testing, opposition to mandatory testing for expatriates, healthcare strain, inadequate home isolation facilities, affordability issues, and economic repercussions like job losses, particularly impacting women and informal workers. Managing returning Non-Resident Keralites (NRKs) and migrants required adaptive and collaborative approaches.

Maharashtra

Maharashtra, one of the worst-hit states during the COVID-19 pandemic in India, responded with a mix of state-specific measures and adherence to central guidelines, focusing on organizational development, resource allocation, and flexible decision-making. With around 2 million reported cases out of India's total of 10 million,

the densely populated nature of Maharashtra posed significant challenges for its healthcare system, particularly in Mumbai, where the population density is as high as 20,634 people per square kilometer, making it difficult to enforce social distancing measures effectively. Consequently, infected individuals had few options beyond hospitalization for isolation and treatment. Under the leadership of the Chief Minister, Maharashtra established a task force in coordination with the Indian Council of Medical Research (ICMR) to devise protocols and advise the health ministry based on the state's evolving situation. This task force played a pivotal role in guiding administrative decisions, ensuring efficient distribution of resources like funds and manpower, with government hospitals and the Medical Education Department playing crucial roles in meeting the healthcare needs of the state's large population during the pandemic.

Public health

In Maharashtra, COVID-19 has accounted for 5.3% of total deaths, reducing life expectancy from 73.2 to 72.4 years by the end of 2020, highlighting the urgent need for targeted public health interventions. The state responded to the pandemic by significantly expanding medical infrastructure, tripling ventilator capacity to over 1,300 within six months, and increasing testing centers from three to 185 with government and corporate support. Shortages of postgraduate students necessitated interdisciplinary care in managing COVID-19 wards and ICUs, with healthcare professionals demonstrating resilience and dedication throughout. Repurposed public spaces served as temporary healthcare facilities to accommodate patient overflow, and the nationwide vaccination campaign commenced with healthcare workers as priority recipients, reflecting a critical step in pandemic mitigation (*COVID-19 Pandemic: Did Strict Mobility Restrictions Save Lives and Healthcare Costs in Maharashtra, India?*).

Maharashtra's pandemic response combined historical crisis management strategies with modern approaches, emphasizing collaboration and information sharing to safeguard populations. The state rapidly increased ventilator availability and testing capacity, with healthcare workers stepping up to manage COVID-19 patients under challenging circumstances. Despite effective initiatives like drive-through testing, affordability issues persisted, potentially leading to underreporting among economically disadvantaged groups.

Maharashtra's response also included setting up jumbo COVID centers in exhibition centers to manage patient overflow, alongside district-level oxygen management plans to address critical shortages during the second wave. However, analysts noted substantial underestimation of infection and death rates, with studies indicating a 27% increase in all-cause mortality in healthcare facilities. Excess deaths were estimated at 212,589, significantly higher than the official figure, impacting the working class with economic repercussions and job losses, particularly affecting women and informal sector workers. Stringent measures such as district border closures and a nationwide lockdown were implemented to curb the spread of COVID-19, reflecting the gravity of the crisis and the challenges faced by Maharashtra during the pandemic. (*COVID-19*

Pandemic: Did Strict Mobility Restrictions Save Lives and Healthcare Costs in Maharashtra, India?,)

Social Welfare

Efforts have prioritized utilizing available funds for distributing rations, establishing shelter homes, community kitchens, providing medical equipment, and raising awareness through local media. Challenges persist in stocking the Public Distribution System (PDS) to meet the needs of approximately 75 million below poverty line (BPL) beneficiaries and 7 million above poverty line (APL) beneficiaries. In response to the plight of migrants, the Chief Minister allocated Rs 45 crore for food and accommodation, resulting in numerous relief camps across the state to support migrants. (Das & Pardeshi)

The Maharashtra government introduced a scheme offering fixed deposits of INR 500,000 (US$6,695) for children who lost parents to COVID-19, along with a monthly allowance of INR 1,125 (US$15) for eligible beneficiaries under 18 years old. 'Mission Vatsalya' consolidated 18 welfare schemes aiding widows from rural and deprived backgrounds. The Women and Child Development department reported 13,540 fathers and 1,763 mothers died from COVID-19 in Maharashtra, with an increase in child marriages due to lockdown-induced uncertainties, prompting interventions to prevent such occurrences. (Das & Pardeshi)

The government allocated INR 450 million (US$6,017,256) to provide food and accommodation for migrant laborers, with collaborative efforts setting up shelters, kitchens, and awareness programs. Non-governmental organizations adapted activities towards pandemic response, including screening and distributing supplies. However, relief measures like the Pradhan Mantri Garib Kalyan Anna Yojana faced challenges in reaching migrants due to documentation requirements, exposing gaps in support for vulnerable populations during the crisis. (Duvendack)

A case study on Dharavi

Dharavi, known for its extreme population density where 60% of Mumbai's residents occupy just 6% of the city's land, surprisingly accounted for only 2.2% of Mumbai's COVID-19 cases despite its risky environment. The local municipal corporation swiftly responded with strict measures like area cordoning, extensive sanitization, door-to-door screenings, and collaboration with private practitioners and NGOs to establish community facilities including kitchens and quarantine centers, alongside a stringent lockdown with 24 checkpoints to limit movement. Initiatives like 'Chase the Virus', 'Chase the Patients', 'Mission Zero', and 'Mission Save Lives' were effective during the second wave, mobilizing resources through mobile testing units and volunteer "COVID Yoddhas". (Latief, 2020) Schools and event venues were repurposed into quarantine centers offering free meals and medical services. Within 14 days, a 200-bed hospital was built to promptly address patient needs. Dharavi's COVID-19 journey began in April 2020 with 491 cases, peaking at 48 daily cases in May before declining due to concerted efforts, reducing the growth rate to 4.3% by month's end. The BMC's 4-Ts

model—Tracing, Tracking, Testing, and Treating—alongside a decentralized setup with command posts in each ward and walk-in COVID-19 care centers efficiently managed RT-PCR results and promptly treated positive cases, saving thousands of lives through timely intervention. (Kaushal & Mahajan, 2021)

Comparison between Maharashtra and Kerala

In comparing the response to the virus between Kerala and Maharashtra during the COVID-19 pandemic, both states faced unique challenges and implemented distinct strategies. Kerala, with its high population density and large expatriate community, employed proactive interventions like surveillance, quality quarantine, and widespread testing, resulting in one of the highest recovery rates, low death rate, and slow case progression. The state prioritized community participation, proactive care for vulnerable populations, and educational campaigns to promote behavioral changes. Kerala's public health infrastructure, rooted in a historical legacy, includes an extensive network of healthcare centers and a high doctor-to-patient ratio. The state emphasized decentralized management integrated into a centralized epidemic control framework and utilized innovative technologies like drone surveillance and geo-fencing.

On the other hand, Maharashtra, with densely populated cities like Mumbai, faced significant challenges in enforcing social distancing measures effectively. The state responded with expanded medical infrastructure, tripling ventilator capacity and increasing testing centers, but encountered shortages of healthcare professionals and affordability issues with testing. Maharashtra's response integrated historical crisis management approaches with modern strategies, emphasizing collaboration and information sharing. Social welfare efforts in both states focused on providing relief to vulnerable populations, including migrants, through food distribution, shelter homes, and financial support schemes for affected families.

While both states implemented robust responses tailored to their contexts, Kerala's approach emphasized community engagement and proactive measures, leveraging its public health legacy, while Maharashtra's response involved a mix of state-specific measures and adherence to central guidelines, with a focus on expanding medical infrastructure and social welfare initiatives. Each state's response reflects its unique challenges and strengths in combating the COVID-19 pandemic.

Odisha

Odisha, an eastern state of India, faced significant challenges when the COVID-19 pandemic began. Unlike Kerala, the state's healthcare system was not very robust, with only 0.8 hospital beds for every 1000 people.(https://health.odisha.gov.in/sites/default/files/2020-02/Final_Tender.pdf) Despite this, Odisha managed to take some important steps early on. The state confirmed its first COVID-19 case on March 16, 2020,(https://www.indiatoday.in/india/story/odisha-coronavirus-positive-case-1655901-2

020-03-16) almost two months after Kerala had reported its first case at Thrissur(https://doi.org/10.4103%2Fijmr.IJMR_2131_20). This gave Odisha some time to plan and learn from the experiences of other states.

Public Health

Odisha was quick to act against the COVID-19 threat. It was one of the first states to start a lockdown, even before the Indian government ordered a lockdown for the whole country. This early decision was part of declaring the pandemic a state disaster on March 13, 2020, showing how seriously Odisha was taking the threat (https://ndma.gov.in/sites/default/files/PDF/covid/response-to-covid19-by-odisha.pdf).
The state created a comprehensive dedicated portal- covid19.odisha.gov.in

Odisha took a leading step by setting up hospitals just for COVID-19 patients, which helped keep the virus from spreading to other patients and focused resources on treating the disease. The state also required people returning from other countries to register on a special COVID portal within 24 hours of their arrival and to stay at home for 14 days to ensure they did not spread the virus. They were given 15,000 rupees to encourage them to follow these rules, which helped officials keep track of potential new cases.(https://prsindia.org/theprsblog/odisha-government%E2%80%99s-response-to-covid-19)

The government made sure that private hospitals followed strict rules to prevent the virus from spreading. These hospitals had to have different entrances for different types of patients(ibid) and control how many visitors came in. The government also controlled what the media could report about COVID-19 patients and their families. This was to prevent fear and unfair treatment of those affected by the virus.

Odisha needed more health workers. On March 23, the government decided to hire more nurses and paramedics for a short time. These health workers were paid extra incentives. This was a key step in making sure that the healthcare system could handle the growing number of cases.

On April 7, 2020, the Odisha government introduced the Epidemic Diseases (Amendment) Ordinance to help control the spread of COVID-19. This law was aimed at stopping the spread of dangerous diseases. Just two days later, on April 9, the government made it mandatory for everyone to wear masks whenever they left their homes. By April 16, new rules were added to prevent spitting in public places, as spitting could increase the risk of spreading the virus.(ibid) However, following these new rules was challenging in a state like Odisha, where public habits and the state capacity varied widely.

To better manage the crisis, the government invited senior professionals with expertise in healthcare management, international logistics, and charity work to serve as Honorary Advisors. These experts volunteered to help the government, offering their knowledge and skills to improve the state's response to the pandemic.

Furthermore, the government took proactive steps in education and training to prepare for any future increase in COVID-19 cases. MBBS students from the 7th, 8th, and 9th semesters at all medical colleges were trained to be ready to help. This training started with government institutions and was also extended to private colleges, where both doctors and students were equipped with the necessary skills to handle potential outbreaks.

These measures were part of a broader strategy to strengthen Odisha's healthcare response and ensure that both public and private medical resources were prepared to deal with the pandemic effectively.

Migration and Support for Migrants in Odisha During COVID-19

Introduction to Migration Challenges

Odisha, with a significant portion of its youth and middle-aged population working outside the state in unorganized sectors, faced unique challenges during the COVID-19 pandemic. The lack of comprehensive, region-specific data on these migrants complicated the response efforts. When the national lockdown was implemented and industries across the country shut down, many Odia workers lost their jobs and faced the harsh reality of having to return home without any income.

Support and Shelter for Returning Migrants

To address this issue, the government took swift action. On March 28, the Odisha government directed District Collectors and Municipal Commissioners to convert closed schools and hostel buildings into temporary shelters for returning migrants. This provided them with a place to stay during the uncertain times of the lockdown.

Additionally, to ensure that the basic needs of the needy in rural areas were met, the government arranged for hot cooked food to be available at affordable prices. This initiative helped alleviate some of the immediate hardships faced by the rural population, including migrants who had returned to their villages.

Monitoring and Control Room Setup

The Home Department set up a 24-hour control room to monitor the implementation of the lockdown and to keep track of Odias stranded in various parts of the country. This control room played a crucial role in coordinating rescue and relief efforts for these individuals, ensuring they received the necessary support during this critical time.

Employment and Economic Support Through MGNREGS

Recognizing the economic impact of the lockdown on the migrant population, the government also implemented key measures under the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS). Job cards were issued to those interested in undertaking unskilled work, and tasks that involved groups of up to five

persons were allowed, facilitating employment while maintaining necessary health precautions.

Decentralised system for Handling Influx of Returning Migrants

The government issued an advisory to Gram Panchayats and Urban Local Bodies to effectively manage the influx of migrants returning from other parts of the country:

1. All local bodies were instructed to set up registration facilities, enabling returning residents to register either directly or through relatives.
2. Everyone arriving from other states was required to undergo a 14-day quarantine.
3. An incentive of 2,000 rupees was offered to individuals who completed their quarantine period, encouraging adherence to this crucial public health measure.

Conclusion: Despite not having a healthcare system as developed as Kerala's, Odisha effectively utilized lessons from other states and international examples to tackle its public health and migration challenges during the COVID-19 pandemic. The state's well-established disaster management infrastructure, extending down to the panchayat level, played a crucial role in mobilizing capacity and implementing robust response strategies quickly and efficiently.

A stable political environment and a well-coordinated bureaucratic regime in Odisha worked synchronously to address the urgent needs arising from the pandemic. Policy guidelines were swiftly put in place, reflecting a proactive approach to managing both the health crisis and the socioeconomic fallout, particularly for the migrant population.

However, the historical lack of medical facilities in the state posed significant challenges. The existing healthcare infrastructure struggled to meet the increased demand, highlighting a critical area that requires attention for future resilience. Odisha's experience during the pandemic underscores the importance of strengthening healthcare systems and maintaining agile administrative mechanisms to better serve the population in times of crisis.

References

1. Kudumbashree. Retrieved April 21, 2024, from http://www.kudumbashree.org
2. Wikipedia. Retrieved April 21, 2024, from
3. http://nhm.gov.in/images/pdf/monitoring/crm/4thcrm/report/kerala.pdf#page11
4. calicut district administration. (n.d.). Udayam | Home for Transition, Kozhikode. Retrieved April 21, 2024, from https://www.udayam.kerala.gov.in/

5. *COVID-19 Pandemic: Did Strict Mobility Restrictions Save Lives and Healthcare Costs in Maharashtra, India?* (n.d.). NCBI. Retrieved April 21, 2024, from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10379405/
6. Das, S., & Pardeshi, P. (n.d.). *COVID-19 Pandemic: Maharashtra – Civil Society Response and Challenges Ahead*. azim premji university. Retrieved April 21, 2024, from https://practiceconnect.azimpremjiuniversity.edu.in/covid-19-pandemic-maharashtra-civil-society-response-and-challenges-ahead/
7. *Demand for Grants 2023-24 Analysis : Health and Family Welfare*. (n.d.). PRS India. Retrieved April 21, 2024, from https://prsindia.org/budgets/parliament/demand-for-grants-2023-24-analysis-health-and-family-welfare
8. Duvendack, M. (n.d.). Responding to the Multifaceted COVID-19 Crisis: The Case of Mumbai, India. *sage journal*, *21*(4).
9. *Epidemiology and Response to the COVID-19 Pandemic in Kerala, India, 2020–2021: A Cross-Sectional Study*. (2022, June 14). NCBI. Retrieved April 21, 2024, from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9230740/
10. *Financial Burden and Catastrophic Health Expenditure Associated with COVID-19 Hospitalizations in Kerala, South India*. (n.d.). NCBI. Retrieved April 21, 2024, from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9270006/
11. Kaushal, J., & Mahajan, P. (2021, January 12). *Asia's largest urban slum-Dharavi: A global model for management of COVID-19*. NCBI. Retrieved April 21, 2024, from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7832248/
12. kerala govt. (n.d.). Official Kerala Dashboard. Retrieved April 21, 2024, from https://dashboard.kerala.gov.in/
13. Latief, S. (2020, November 9). How Mumbai's Dharavi flattened the Covid-19 curve | India News. *Times of India*. https://timesofindia.indiatimes.com/india/explained-how-mumbais-dharavi-flattened-the-covid-19-curve/articleshow/76910062.cms
14. *List of districts of Kerala*. (n.d.). Population Census 2011. Retrieved April 21, 2024, from https://www.census2011.co.in/census/state/districtlist/kerala.html
15. ministry of health and family welfare. (n.d.). *making the sdg a reality*.

PIB India. (2018). *Ministry of health and family welfare*. PIB press release. pib.gov.in