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CAPACITY BUILDING INITIATIVES OF INDIAN GOVERNMENT TO COMBAT COVID 19

Krishna KANABAR[1]
Nityesh BHATT[2]

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Abstract: *With more than four million deaths and 200 million confirmed cases globally (WHO, 2021b), Covid-19 catastrophe and its second wave infringed nations beyond anticipation. The solace came with Covid-19 Vaccines, although, societal perceptions associated with vaccine proved a colossal test. With secondary data, this research attempts to identify how India, responded to such a ferocious infectious disease and how it initiated Covid-19 vaccine immunization drive by operationalizing existing capacities. The research delineates capacity building challenges and effectiveness of measures adopted by the Indian government. As the gigantic immunization drive is ongoing in India, it anatomizes learnings for practitioners and academic research.*

Keywords: *Capacity building; Covid-19; Immunization; India; Vaccines*

Introduction

The world experienced radical changes ever since Covid-19 catastrophe. Because of the infectious virus spread; social and economic milieu of nations experienced intense volatility (v), uncertainty (u), complexities (c) leading to ambiguity (a), posing the VUCA test to the countries. According to the World Bank estimation, Covid-19 recession observed one of the worst downgrades in growth projection from all the recessions since 1990 (Blake & Wadhwa, 2020). In March 2021, the International Monetary Fund (IMF) estimated global growth to be 6%, which was 0.5 % over

[1] Assistant Professor – OB and Communication Area, Institute of Management, Nirma University, Ahmedabad, India, E-mail: krishna.kanabar@nirmauni.ac.in, ORCID ID: http://orcid.org/0000-0003-1220-1451

[2] Professor – Information Management Area, Institute of Management, Nirma University, Ahmedabad, India, E-mail: nityesh@nirmauni.ac.in, ORCID ID: https://orcid.org/0000-0003-4215-2355

January, 2021 estimation due to intensifying vaccine coverage in nations and financial stimulus in major economies (IMF, 2021).

As per one of the UN reports, additional 108 million workers were pushed into poverty and more than 200 million were likely to be unemployed by 2022 (PTI, 2021b). Various sectors such as tourism, banking and real estate were affected. India's national unemployment rate observed to be twelve month high with 11.9% in May 2021 against 7.97% in April 2021, whereas urban unemployment climbed to 14.73% in May 2021 against 9.78% in April 2021 (Sharma, 2021). Besides, loss experienced due to Covid-19 pandemic did not limit to socio-economic area alone but was brutal on human lives and resulted in more than 4.8 million fatalities (WHO, 2021b).

The countries resorted to numerous measures for containment of Covid-19 across the world. India responded to the first wave of Covid-19 strategically with measures such as nationwide lockdown, formation of scientific national taskforce as well as economic response task force, restrictions on socialization and emphasis on Covid-19 appropriate behavior, issuance of Covid-19 treatment protocol for healthcare professionals, setting up of additional medical infrastructure and initiating one of the largest public health immunization drives. Ram, Babu and Prabhakaran (2020) noted that protective measures such as thermal screening, travel history, securing symptoms, airport screening and novel smartphone application called "Aarogya Setu" for contact tracing were initiated in the country during the first wave. However, the second wave observed peak of more than 0.4 million daily cases of infection that overturned containment in the country.

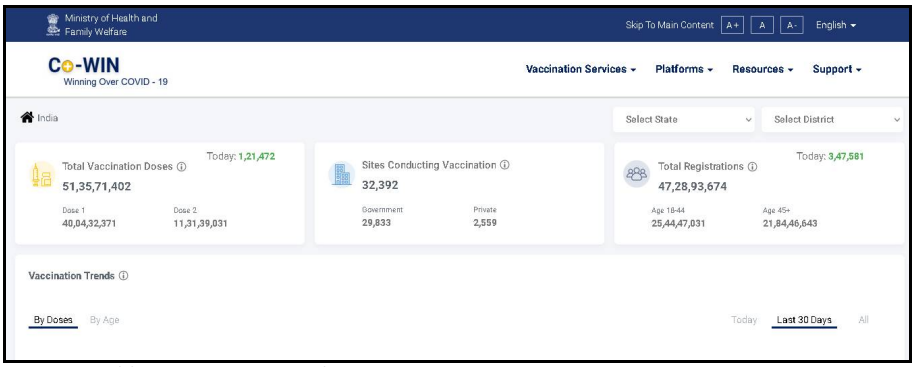
Covid-19 and Indian Response

During coronavirus crisis, vaccine aspirants surfaced from around the world through collaborations. World Health Organization's (WHO) Covid-19 vaccine tracker detailed that number of vaccines in clinical and pre-clinical development were 110 and 184 respectively in early August 2021 (WHO, 2021a). India's medical regulator initially approved two Covid-19 vaccines viz., Covishield (native name for Oxford-AstraZeneca vaccine advanced in the UK and manufactured by Serum Institute of India Ltd.) and Covaxin (by Bharat Biotech International Limited) for emergency use to battle the contagious coronavirus. Later, Russia's Sputnik V in collaboration with Dr. Reddy's Laboratories, Moderna and Johnson and Johnson's single dose vaccines and DRDO's drug 2-DG were also approved.

Indian government adopted detailed governance mechanism model at multi-level, covering its 28 states, 8 Union territories, 736 districts and 7198 blocks (GoI, 2021) to inoculate its massive 1.38 billion population. An integration of varied government departments and development partners, training and capacity building activities, prioritization of beneficiaries, site planning, engagement of private sectors, logistics of vaccines and cold chain management, preparation for adverse events following immunization (AEIF), and monitoring and supervision of vaccination program were some of the critical challenges while developing operational guidelines for a mammoth nationwide vaccination drive (MoHFW, 2020).

The National Expert Group on Vaccine Administration for Covid-19 (NEGVAC) planned entire vaccination process in accordance with the election process and formed a vaccination team of four leading vaccination officers at each center. These vaccination officers were assigned the tasks such as to administer injection, to regulate the entry to vaccination session, to authenticate documents and to support the crowd management, provide information, education and communication messages (IEC) and to support the vaccination team (MoHFW, 2020). However, to keep a track of the beneficiaries proved to be a challenging task. Hence, electoral roll for the Lok Sabha (lower house of Indian parliament) and legislative assembly election were used to identify the "priority population", i.e. population over 60 years and above. To register and track beneficiaries for immunization, to maintain vaccine stocks and implement effective vaccine delivery, government developed a digital platform called "Covid-19 Vaccine Intelligence Network" (Co-WIN).

Figure 1: Co-WIN Dashboard



Source: https://dashboard.cowin.gov.in/

Additionally, beneficiaries could also register through "Aarogya Setu" (more than 200 million downloads) portal in addition to on-site registrations (Annexure 2). To implement one of the largest vaccination drives in the world, Indian government required to ramp up capacity. Hawe, Noort, King and Jordens (1997, p. 29) noted that capacity building was the foundation for most of the health promotion programs.

Capacity Building for Containment of Covid-19

Bergeron et al. (2017) referred that WHO demarcated capacity building in health care as advancement of knowledge, skills, commitment, structures, systems and leadership to facilitate effective health promotion. Smith, Tang and Nutbeam (2006, p. 340) decoded capacity building for health promotion in two key areas, viz. organizational level and community level. Organizational level capacity building comprised of training of staff, providing resources, designing policies and procedures to institutionalize health promotion and developing structures for health promotion planning and evaluation.

Community level capacity building included raising awareness about health risks, strategies to foster community interconnections, education to foster health literacy and enabling access to external resources. In nutshell, capacity building had been defined by various researchers in terms of policy framework and procedures, provisioning of resources, governance and leadership, collaborative partnership, infrastructure, communication, and technology (Crisp, Hal and Stephen, 2000, p. 99; Horton & MacLeod, 2008, p. 69).

Being the producer of over 60% of the world's vaccines, India was considered world's pharmacy. With approval of Covishield and Covaxin for emergency use in the country, India initiated the mammoth vaccination program and conducted mock drill in two phases. On successful completion, India opened the vaccination drive for its priority population and achieved 100 million vaccine mark in just 85 days against 89 days in the United States and 102 days in China (Chandorkar, 2021). Following NEGVAC guidelines, more than 8 million healthcare and frontline workers (officials from Police department, armed forces, home guard, disaster management, civil defense organization, prison staff, municipal workers, surveillance staff etc.) were inoculated in the first phase (Sarkar, 2021). In the next phase that started on March 1, 2021, inoculation drive was opened for senior citizens (60 years and above), categorized as "priority population" and for those in age group 45-59 with co-morbidities. This was later extended for all individuals above 45 years and for everyone above 18 years from April 1, 2021, and May 1, 2021 respectively.

However, in March to May 2021, India was quavered by a sudden, unprecedented second wave of Covid-19. The devastating infliction staggered everyone, shattered medical infrastructure, and eventuated into ferocious casualties for want of adequate supplies of medicines, oxygen supply, beds, and healthcare professionals. As the stratospheric turnout at the hospitals continued, India recorded a peak of more than 0.4 million cases during this period. Severe shortage of oxygen supply, critical medicines, hospital beds (including ICU beds), staff, vaccines etc. were reported frequently by media.

The 2020-21 Annual report of the ministry of health and family welfare indicated that India had over 1.5 million dedicated isolation beds in approximately 15,000 dedicated Covid-19 treatment facilities, little over 270,000 oxygen supported beds, approximately 80,000 ICU beds and 40,000 ventilator beds by December, 2020 (MoHFW, 2021a). By the end of the first wave, number of infection cases plummeted and as a consequence, ICU beds were cut down by 46% while oxygen beds dropped by 36% in the country (Rawat et al., 2021). This led to chronic shortage of beds during the brutal second wave. Experiencing backlash for this act and observing spike in number of cases in the country, government attempted to augment capacities for medical supplies and resources, infrastructure, and reform policies.

Organizational level Capacity building

The second wave of Covid-19 in India observed a sudden frenzy in the demand for a critical medicine "Remdesivir" which led to shortfall in the supply. Recognizing this deficit, Indian government accelerated approval of production of this critical medicine

to seven companies, viz. Cipla, Dr Reddy's Lab, Hetero, Jubilant Pharma, Mylan, Syngene and Zydus Cadila in April 2021. Government also showed readiness to approve other companies manufacturing the medicine with necessary raw material and WHO permissions in just 24 hours. As a result, number of "Remdesivir" producing plants surged substantially in April 2021. In second week of May 2021, production of "Remdesivir" amplified to around 10.5 million vials a month compared to 3.7 million vials per month in April 2021 (PTI, 2021a). Government also streamlined import of raw material and waived custom duties on components used for the antiviral drug. It also barred export of vials to address the shortfall. Besides, government requested leading doctors of the country to educate people on correct usage of the antiviral drug. Government intervention also resulted in nearly 50 % reduction in the cost of the medicine. Government also collaborated with state administrations to curb hoarding of the drug and assured private drug producers to procure excess stock of the vials.

Nonstop news of fatalities and shortage of essential healthcare supplies in media during the second wave resulted in unexpected turnouts at vaccination centers. This triggered paucity of vaccines in the country. However, Indian vaccine manufacturers (Serum Institute of India and Bharat Biotech) over-assessed their capacity to supply adequate vaccine doses and waned from the earlier vaccine doses assured. To meet the vaccine demand, Indian government approved Sputnik V vaccine (from the Russian Direct Investment Fund) in association with Dr. Reddy's Laboratories in April 2021. Besides, Drug Controller General of India (DCGI) also approved DRDO's anti-Covid-19 oral drug 2-DG in first week of May, 2021. India also initiated procurement of vaccines from international manufacturers such as Pfizer, Moderna and Johnson & Johnson and offered them all assistance including indemnity (Tribuneindia News Services, 2021). India administered over 920 million doses to its people by early October, 2021. (MoHFW, 2021b). Government also approved three public sector companies i.e., Haffkine Biopharmaceutical Corporation Ltd., Indian Immunological Limited and Bharat Immunological and Biologicals Limited to upscale the production of Covaxin. Additional sites for inoculation, drive-through facilities and on-site registrations were initiated as government extended free vaccines to all the citizens above 18 years of age.

To address dearth of medical oxygen supply, government barred usage of liquid oxygen for non-medical purposes and directed its availability and production for medical use only (Ray, 2021). Additionally, it decided to import 50,000 metric ton of oxygen (Express News Service, 2021). India also received global assistance by way of cryogenic oxygen tanks, oxygen generators, industrial and individual concentrators. Leading corporate houses of India stepped up to offer support and shipped oxygen concentrators from overseas and supplied oxygen from their plants.

Government also waived basic customs duty and health-cess on import of oxygen related equipment for a period of three months and counted funds spent for fighting Covid-19 eligible for mandatory corporate social responsibility. Industries that could use nitrogen plants for producing medical oxygen were also identified. Indian Railways ran special 'Oxygen Express'. The Supreme Court of India also set up a National Task Force (NTF) to guide and assist central government in allocation of medical oxygen to different states (Lahariya, 2021).

Indian government initiated make-shift hospitals, Covid-19 care centers and facilities on war-footing. The Defense Research and Development Organization (DRDO) built Covid-19 hospital facilities in several states. Armed forces also mobilized their retired doctors to attend the escalating number of patients. Acknowledging the scarcity of trained healthcare professionals, government roped in final year medical students, interns and nursing students and offered financial incentives, priority in government jobs and 'COVID National Service Samman' (recognition for Covid national service). Identifying medical professional at municipal, district and state levels and designate them as 'Covid Warrior' were some key actions by the government after a sudden spike (Raj, 2021).

As health is considered a state subject in India; government not only decentralized but also provided autonomy to state administrations for procuring vaccines. Hence, various states issued global tenders to procure vaccines for its people. This decision was later revoked due to multiple challenges. Government also provided an advance schedule of immunization to state administrations for effective planning for each district and vaccine site. Besides, interval between both the vaccine doses was increased to 12 to 16 weeks by the government from earlier four to six weeks. This proved to be a strategic move to cover more number of people.

Several state governments-imposed lockdown and night curfew to restrict movements of people, advised people against large gatherings, and capped number of attendees at wedding and at funeral. Government also launched Indian SARS-CoV-2 Genomics Consortium (INSACOG) to study genome sequencing, mutations, its impact and virus surveillance. This consortium encompassed ten national laboratories (Kunal, Aditi, Gupta and Ish, 2021, p. 784).

End-to-end cold chain storage facilities, uninterrupted transport services and adaptive surveillance system believed to be backbone for effective immunization administration. The vaccine manufacturers in India transported vaccines in a refrigerated truck to the airport from their production facilities. Later, the vaccines were secured in ice-packed thermocol boxes in air cargo and shipped to Government Medical Store Depots (GMSDs) or the primary vaccine storage facilities operated by the Directorate General of Health Services (DGHS). These vaccine shipments were also sent to the GMSDs by road in refrigerated trucks and subsequently to different states. The state vaccine stores then distributed vaccines to regional, district and sub-district level cold chain points via insulated vans, where the vaccines were further being carried by staff members in iceboxes to authorized vaccine sites. India has approximately 29,000 cold chain points to store the vaccines at prescribed temperatures between 2 to 8 degree Celsius (Mukul & Raghavan, 2021).

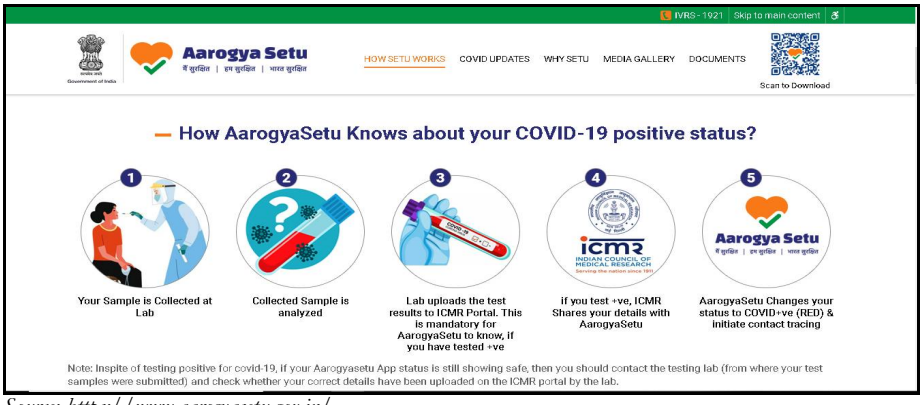
Monitoring and verification of vaccine doses believed to be another crucial pillar of immunization drive. India's vaccine management employed a real-time supply chain management system known as the electronic vaccine intelligence network (eVIN). It tracked vaccine doses offered, its movements, and thus, reduced possibilities of replicas and tampering. It also aided in identifying batch administered to beneficiaries, in case of adverse reaction. To help track each vaccine through supply chain, 'GS1 India'

organization was entrusted by Ministry of Commerce. This IT enabled system worked with leading vaccine producers in the country. (Bhardwaj, 2021).

Covid-19 vaccines were delivered to states free of cost for phase one and phase two of vaccination drive. For phase three initiated on May 1, 2021, central government received 50% of the vaccine produce for distribution to states and Union Territories (UT) based on the criteria of extent of infection. The remaining 50% of vaccines produce was available to state administrations and private hospitals for purchase from vaccine manufacturers directly (Goyal, 2021). Later, this ratio changed to 75 % (free vaccine distribution to states by center) and 25 % (procurement by private hospitals) as government announced free of cost vaccines to all those above 18 years in government facilities. Additionally, Indian government announced free ration to approximately 800 million economically backward and devastated people in the country till November 2021. This move estimated to cost nearly 19.54 Billion USD to the government (Singh, 2021). The country also initiated clinical trials of 'Covaxin' on children (12-18 Years) in June 2021.

India's immunization program witnessed a considerate reliance on the information technology. During the first wave of pandemic, government's focus was on disseminating information about the spread of virus, identifying infected people within the vicinity, tracing and treating those infected as well as updating information on "Aarogya Setu" web portal.

Figure 2: Aarogya Setu Portal



Source: https://www.aarogyasetu.gov.in/

After initiating the nationwide immunization drive, government intensified engaging its tech-savvy population in all the possible ways; right from disseminating Covid-19 specific information over different digital media platforms, updating real-time information of spread of virus to identifying vaccination cites and registrations or downloading certificates of immunization.

The nation launched "Co-WIN" mobile application and web portal for identifying the beneficiaries, registration and verification of their identities, notifying those registered about their subsequent vaccine doses and supporting them in downloading vaccination certificates. To ease the registration process, "Co-WIN" was also made available in national and several regional languages. However, beneficiaries experienced technical glitches not only to register but also to book slots for vaccination. Frequent crash of "Co-WIN" mobile application and website was also experienced. The issue further aggravated as government made online registrations mandatory for beneficiaries above 18 years from May 1, 2021. This decision was revoked later as many people stranded because of technological problems.

Community level Capacity Building

Government of India's Ministry of Health and Family Welfare developed and issued Covid-19 Vaccine Communication Strategy in early 2021. Its aim was to diffuse in-time and systematic information on vaccine rollout, shed apprehensions and escalate uptake. This strategy specified details on types of vaccines, varied target audiences, initiatives for promotion of vaccines, capacity building strategies, probable ways to brace mass media activities for engaging communities, and monitoring and evaluation of vaccine roll-out. It also offered communication and media plans along with the roles and responsibilities of various departments and ministries (Hopkins, 2021). The strategy also deliberated role of community and religious leaders and other influencers. State administrations were also suggested to develop and execute a decentralized communication strategy, especially for rural and tribal areas.

Various communication interventions by government required to focus on contextual determinants such as socio-cultural environment and influence of social groups in addressing vaccine hesitancy (MacDonald & SAGE Working Group on Vaccine Hesitancy, 2015, p. 4161). Hence, India strategized multilayered, multilingual communication strategy to educate citizens for vaccine uptake and focused on building trust, addressing fears and misconceptions around the vaccines responsible for vaccine cynicism, negativity, and hesitancy. The communication approach at each stage attempted to provide clear, detailed, and targeted information to expedite mass immunization drive. During the first wave, 24*7 National Centre for Disease Control (NCDC) was operational, and a national helpline was made available for inquiries related to COVID-19 and behavioral health. From vaccination approval to implement the mammoth public immunization program in different phases, government methodically disseminated information of vaccination process and its eligibility criteria. Regular press-conferences and media briefings were carried out by government officials to provide first-hand information on vaccination drive, to update developments; with an appeal to abstain from misreporting. The Prime Minister of India also addressed the nation on multiple occasions in fight against the coronavirus and apprised citizens on key policy decisions.

Safety and efficacy of Indian vaccines were repeatedly broadcasted across all media, including online platforms. Government also promoted Covid-19 appropriate behavior and vaccines repeatedly through caller-tunes across all cellular networks in various

languages. These caller-tunes had voice-over of some of the most popular film stars of the country like Mr. Amitabh Bachchan, repeatedly advocating assurance of efficacy and safety of Indian vaccines. The caller-tune also appealed to get vaccinated when eligible and requested to follow Covid-19 protocol. This was in addition to continued, repeated appeals assuring safety and efficacy of vaccines by community leaders and government officials. Zodpey, Negandhi, Dua, Vasudevan and Raja (2020, p. 117) noted that entire government machinery of India and civil society diffused awareness messages during this massive inoculation program.

Analysis and Discussion

Consistent communication from the government officials during lockdown, concrete containment and relief measures and cautious unlocking procedures helped India sail the first wave of infectious disease. However, the second wave caught government off-guard and revealed lapses in proclaimed healthcare infrastructure, inadequate administrative measures, opacity in communication, and evident complacency in Covid-19 appropriate behavior eclipsed progress made during the first wave.

The second wave has prompted lasting social, economic, and psychological distress not just for India but for the world. India's colossal population, constrained healthcare infrastructure including hospital beds, ventilators, oxygen supplies, medicines and medical professionals, unhurried vaccination progress; inhibition to blatant communication posed greater challenges.

Post first wave in the country while the world was laying groundwork for the second wave, India's preparedness and response efforts were not commensurate with its healthcare goals. During the second wave, Bhuyan (2021, p. 1611) observed that Indian government's capacity to re-caliber health infrastructure needed to be flexible and apt (Kumari, 2013, p. 45), considering the "peak and non-peak scenarios". Goel, Sharma and Kashiramka (2021, p. 151) noted that public sector constituted 20 % of total healthcare expenditure in India that represented merely 1% of its GDP. While India grappled to address peak scenario in urban areas; infrastructure in rural settings posed another critical challenge. The immunization campaigns in newspaper, radio, television or on digital media should have insisted on partaking in inoculation drive and consistently reinforce positive health behaviors.

Wang et al. (2013, p. 122) noted that at the time of introducing new vaccines, planning for human and financial resource need to be thought through in detail with logistics. As Indian government collaborated with some of the leading vaccines producers and expanded its vaccine basket (total of five vaccines viz. Covishield, Covaxin, Sputnik V, Moderna and Johnson & Johnson) to address vaccine demand, further actions to facilitate production and funds to private and the public sector should have been provided in time to augment vaccine manufacturing capacities.

Kar, Ransing, Arafat and Menon (2021) noted that administrative barriers such as ineffective co-ordination between states and the central government regarding allocation of medical supplies and vaccines, lack of apparent communication and considerate vaccine wastage acted as obstacle to effective government response.

(McDonald, Goodman, and Hatch, 2020, p. 186) recommended bottom-up structure, keeping local government at the center of response while responding to a crisis.

In addition to administrative barriers, Karlsson et al. (2021) observed that people tend to evaluate safety of the vaccine with respect to how severe they thought disease would be and those assumed the disease to be mild, also believed the vaccine to be unsafe. As complacency was also observed in maintaining Covid-19 protocol after the first wave in India, infection cases peaked; sweeping in the fatal second wave. According to Güner, Hasanoğlu and Aktas (2020, p. 571), one of the most effective defenses for a society was through pre-emption of its spread. Fridman, Lucas and Henke (2020) detailed that onus to scale down impact of Covid-19 epidemic lied heavily on behavioral interventions and policies framed for it (Karim, 2021, p. 59). West, Michie, Rubin and Amlôt (2020, p. 451) insisted on adherence to Covid-19 protocols, changing behavior to break the chain of transmission of SARS-Cov-2.

During the epidemic of gigantic magnitude, government was expected to regularly remain observant of citizens' behavior. In contrast, India observed one of the largest spiritual gathering i.e. 'Kumbh' festival (which was later cancelled and organized symbolically after reaching the zenith of the second wave and severe criticism from across the sections). This event organized once in a decade, witnessed millions of believers assembled from whole country for the holy bath in river Ganges, breaching all guidelines. Besides, the Indian cricket board allowed international cricket matches with thousands of supporters, mostly without masks and social distancing. In addition, Election Commission remained silent about the massive political rallies during the assembly elections in five states. Other such social and spiritual congregations further aggravated the upsurge of exponential cases and deaths, during the lethal second wave. Much later, due to Supreme Court's intervention, such rallies were stopped, and victory parades were also prohibited.

Teslya et al. (2020) emphasized that public health institutions should mobilize citizens to adhere to self-regulated measures. It was observed that for any nation, young adults proved indispensable for mitigation of the SARS-Cov-2. Higher participation from them in immunization programs is required and they need to be engaged in the advocacy and mobilization of vaccination initiatives (Leos-Toro et al., 2021). Quality of information diffused through all the sources proved critical during any health crisis. Engaging and interactive means involving the local media with facts and realities should have been employed in India consistently to propagate positive health behavior. Public health campaigns should have emphasized compassionate attitudes in social distancing. Also, community-specific concerns or rumors for different strata needed to be identified, addressed and counselled at all levels with the help of evidence based communication (Puri, Coomes, Haghbayan and Gunaratne, 2020, p. 2586).

Notably, during the pandemic, people of India exhibited trust deficit in the public health system in many parts of the country (Chetterje, 2020, p. 544). Leaders needed to democratize management and communication of vaccine policy and dissemination protocols with scientists and healthcare professionals (Rozek et al., 2021). This authentic sharing of information with research community and people could strengthen trust in the government (Rai, Zodpey, Gosh and Kadri, 2020, p. 170). Moreover, public

health experts, government officials, policy advisors and experts in epidemiology should be forthcoming and engage in dialogue with citizens frequently. Indian government's scientific advisory must include renowned scientists and experts from AIIMS, ICMR, NEGVAC, National Technical Advisory Group on Immunization (NTAGI) etc. to bring more credibility. Besides, India should develop and sustain open data sharing policies for global alliance. Participation of India in global alliance must be step up with epidemiological capacities and national action plan for health emergencies. (Garg et al., 2020). Inter-country associations with high quality research and accurate documentation may help speed up discoveries and our capacity to fight the virus (Rammohan & Rela, 2020).

For the impending third wave, a detailed planning of the resources would be a game changer. The epidemic would ruin individual and societal aspirations and way of living and emasculate a sense of meaning in people and trust in others (Backhaus et al., 2021). Georgieva et al. (2021) suggested that governments should provide financial compensation to citizens who lost their jobs or income due to containment measures and strengthen compliance. Furthermore, Indian government should learn the best practices from around the world to ease psychological, financial and social distress of its citizens and partner with civil societies.

What happened to India during the second wave also occurred in other parts of the globe and can happen elsewhere too, in future. Therefore, the peers in the wealthier nations need to reflect empathy, connectedness and compassionate attitudes. Global health infrastructure should be ramped up and a genuine commitment to ensure equitable access to vaccines to the developing countries should be inevitable (Wong et al., 2021). Societies must be educated continuously and triggered to follow and sustain positive health behaviors. In times of such an unprecedented health crisis, the world leaders need not merely preach but must lead through compassionate actions.

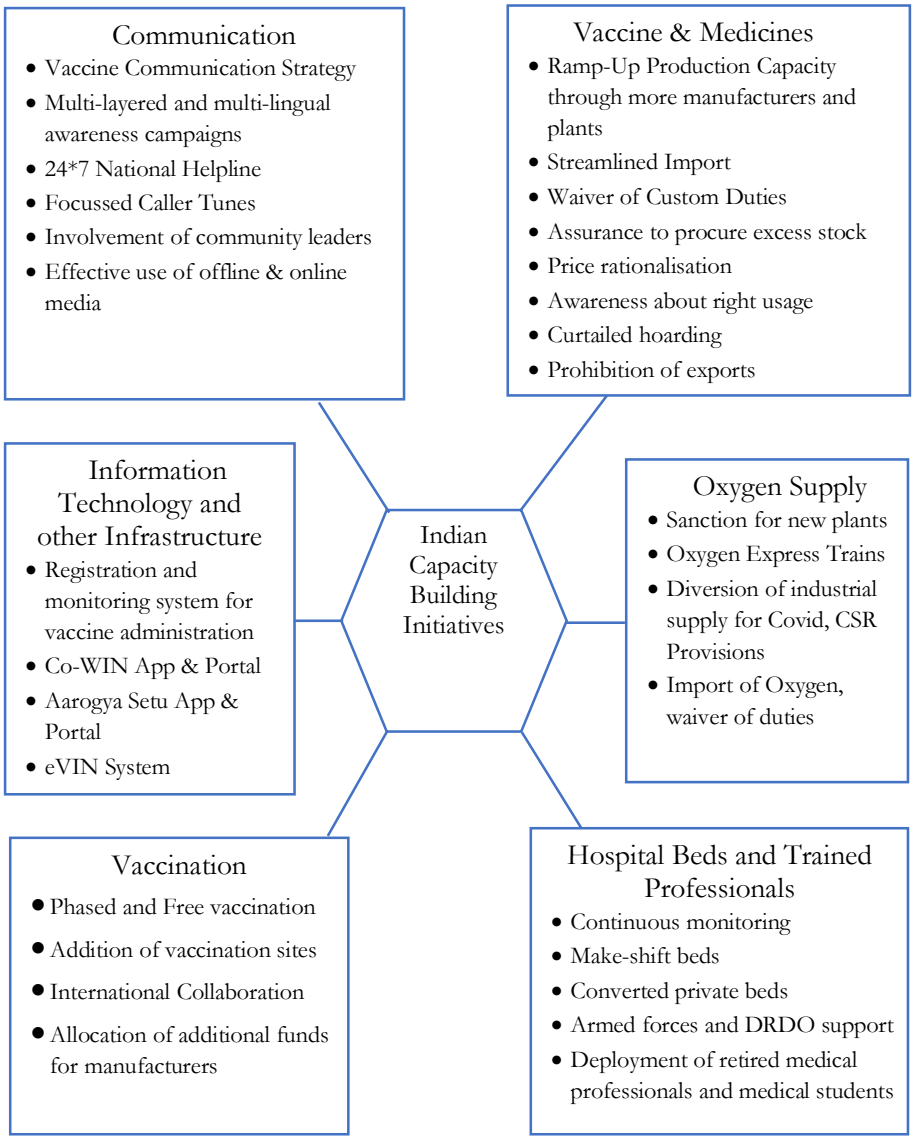
Limitations and Scope for Future Research

While authors made a sincere attempt to showcase and analyze the capacity building initiatives of India Government to combat the second wave of Covid-19, the research was not free from limitations. One of the major limitations was that the paper had been written entirely with secondary information. No government authorities (policy makers, administrators, medical professionals etc.), or citizens were contacted for this research. Also, the scope of this research was confined only to India.

Therefore, the scope for future research can be the following:

Primary research can be conducted to understand the reasons for vaccine hesitancy among various strata of the society i.e. gender, age, region, religion etc. Another useful study can be in form of the comparative analysis of capacity building initiatives of India with other developing countries. Researchers can also perform a detailed analysis of Indian states with the highest per capita vaccination with states observing low vaccination rates. Vaccine wastage is also an important concept requiring an immediate attention. Role of civil society including community leaders, NGOs during the pandemic can also be an interesting area for research. Besides, researchers can also look at the (in) effectiveness of supply chain and technology during an epidemic.

Figure 3: Indian Government's Capacity Building Initiatives (Authors' Creation)



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