

Review Article

Combating COVID-19: the India initiatives

Preeti Kharb^{1*}, Vinod Kapoor¹, Nishant Madan²

¹Department of Pharmacology, Faculty of Medicine and Health Sciences, SGT Medical College, Hospital and Research Institute, Shree Guru Gobind Singh Tricentenary (SGT) University, Gurgaon-Badli Road Chandu, Budhera, Gurugram, Haryana, India

²Research Manager, Medical Affairs and Clinical Research, Sun Pharmaceuticals Limited, Gurugram, Haryana

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*Correspondence:

Ms. Preeti Kharb,

E-mail: preetikharb88@gmail.com

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ABSTRACT

COVID-19 pandemic is one of the few in the history of mankind and presents an enormous global challenge requiring intervention on unprecedented levels. SARS-CoV-2 is a novel virus spreading exceptionally fast and carries high mortality. Health is an important component for human well-being and economic progress. The healthcare set ups globally are being overwhelmed to treat the serious patients with the needs of medical devices such as ventilators for which there is a global shortage. The COVID-19 pandemic has clearly shown the need for further research, developing new vaccines and treatment for COVID-19. To prevent the disease is the only option countries have at the moment for which nationwide lockdown have been implemented. The Government of India has taken several steps from implementing lockdown, announcing a relief package of Rs. 1.7 lakh crores, and rapid improvement in testing capacity among many others. Government of India is committed to facilitate universal and affordable access to all relevant medical products and technologies, both existing and new, to tackle COVID-19 to accelerate progress towards achieving sustainable development goals and universal health coverage. In this article we present the initiatives taken by government to combat COVID-19 pandemic specifically related to the health products.

Keywords: Coronavirus, COVID-19, Government of India, Policy, SARS-CoV-2

INTRODUCTION

Coronavirus disease (COVID-19) is a new infectious disease caused by novel coronavirus, SARS-CoV-2. The World Health Organization (WHO) on 31 December 2019 formally notified about a cluster of cases of pneumonia in Wuhan, China. On January 30, 2020 WHO declared the outbreak of coronavirus disease 2019 (COVID-19) a Public Health Emergency of International Concern. WHO characterized COVID-19 as a pandemic on 11 March 2020.¹ As of 17 June 2020, SARS-CoV-2 the causal virus of COVID-19 has globally infected 8,061,550 cases, including 440,290 deaths, reported to WHO.² India as of 17 June 2020 has 155227 active cases, 186934 cured or discharged, 11903 deaths and 1

migrated.³ India has mortality of 3 per cent only. The recovery rate is 52.80% and is improving continuously.⁴

The impact of the virus has varied across countries but the effect of the novel coronavirus in India is significantly different from the manner in which it has impacted other countries across the globe. On comparison of the progression of cases in India (1,31,868) with USA (15,92,599), Brazil (3,47,398) as well as Italy (2,29,327), one can notice the spike of cases in USA.² The global average of case fatality is 6.45% presently. The case fatality rate in India is also showing a downward trend from 3.30% (15th April 2020) to 2.87% which is among the lowest in world. In terms of case mortality per lakh population, India has so far about 0.3 deaths per lakh

population vis-a-vis approximately 4.1 deaths per lakh population for the world as a whole.⁵

THE GOVERNMENT OF INDIA RESPONSE

India has been fighting the COVID battle with a firm political will. Prime Minister Mr Narendra Modi has ensured speed, scale and determination in handling of this crisis. We present here the Government of India Initiatives from various ministries moving strategically and in tandem with each other to combat COVID-19 including for health products (medicines, vaccines, medical devices, diagnostics, assistive products, cell- and gene-based therapies, and other health technologies) among many others.

India's strategic response to the disease was much ahead in implementing actions targeting core capacities as mandated under the International Health Regulations (IHR), much before the outbreak was declared a Public Health Emergency of International Concern by the World Health Organization. The efforts have been pre-emptive and proactive. India's approach in combating COVID-19 has been fivefold: (i) Maintaining a continuous situation awareness, (ii) Pre-emptive and proactive approach, (iii) Graded response as per continuously evolving scenario, (iv) Inter-sectoral coordination at all levels, and lastly, but most importantly (v) Creating a people's movement to combat this disease.

India started surveillance of flights from COVID affected countries twelve days before India even had the first case in India on the 30 January, 2020. By 22 March, 2020 with less than 400 cases, India had banned all international flights to and from India, and by 25 March, 2020 a nationwide lockdown had been implemented. Universal screening was being done for the international at 21 airports, 12 major seaports and 65 minor seaports and land crossings particularly bordering Nepal was done. A daily status report of screened passengers was updated on website.⁶

The stringency of India's measures is apparent in the stringency score which has been awarded by Oxford University to various countries as part of an ongoing study which analyses the response of the governments of various countries to the COVID-19 situation. India is one of the very few countries which was awarded a score of 100 early on during the situation. The data on 13 indicators such as travel bans, school closures, public transport closures, restrictions on the outside and within the country movement, testing policies and contact tracing is aggregated to calculate stringency index.⁷

Government has taken necessary steps with the evolving scenario of COVID-19. To combat COVID-19, social distancing is one of the primary measures taken by nations to combat the COVID-19 pandemic. India has been classified as "more prepared" as per index of average overall global health security score 2019.⁸

The Union Cabinet chaired by the Prime Minister, Shri Narendra Modi approved INR 15,000 crore for 'India COVID-19 Emergency Response and Health System Preparedness Package'. The funds sanctioned will be utilized in 3 Phases. For immediate COVID-19 Emergency Response, an amount of Rs. 7,774 crore has been provisioned and rest is for medium-term support (1-4 years) that will be provided under mission mode approach. The package's key objective is to slow down and limit COVID-19 in India and will be achieved by mounting the efforts in various areas such as development of diagnostics and COVID-dedicated treatment facilities, through centralized procurement of essential medical equipment and drugs required for treatment of infected patients, strengthening and building resilient national and state health systems to support prevention and preparedness for future disease outbreaks, setting up of laboratories and bolster surveillance activities, bio-security preparedness, pandemic research and proactively engaging communities and conducting risk communication activities. Implementation of all the interventions and initiatives would be done under the umbrella of the Ministry of Health and Family Welfare.⁹

On the directions of the Honourable Prime Minister, a high level Group of Ministers (GOM) was constituted to review, monitor and evaluate the preparedness and measures taken regarding management of COVID-19, in the country. There have been 15 meetings held for the group till 15th May 2020 on COVID-19. The Group of Ministers (GoM) have in depth deliberation on containment strategy and management aspects of COVID-19, as well as the measures being taken by the Centre and various States. GoM is updated about the growing medical infrastructure in the country. The Ministry of Health is regularly assessing the preparedness of states for COVID-19.¹⁰

In a meeting held on 22 April 2020, the Union Cabinet has approved promulgation of an Ordinance to amend the Epidemic Diseases Act, 1897 to protect healthcare service personnel and property against violence during epidemics. The amendment makes acts of violence cognizable and non-bailable offences. The ordinance will infuse confidence in the community of healthcare service personnel to continue to serving mankind through their noble professions in difficult circumstances such as current Covid-19 outbreak.¹¹

MINISTRY OF HEALTH AND FAMILY WELFARE INITIATIVES

Surveillance

India has the requisite national core capacities stipulated in the International Health Regulations to manage public health emergencies. The Integrated Disease Surveillance Programme (IDSP), which is a nation-wide surveillance system for epidemic prone diseases has been activated

towards COVID response, and is being further strengthened with substantive digital inputs.¹²

Infrastructure

For the management of COVID patients, India has made the decision to focus on building exclusive infrastructure to avoid intermingling of COVID patients. Three types of dedicated COVID management centres have been attributed to the positive tested patients: COVID care centres (CCCs) for mild symptomatic cases, COVID health centres (CHCs) for moderate cases and COVID hospitals (CHs) for severe cases. A mapped referral network architecture has been framed for these dedicated COVID facilities for dynamic movement of patients as symptoms evolve, to provide timely and optimal clinical care, commensurate to symptoms.¹³

Indian Railways is supplementing the health care infrastructure of State Governments by providing COVID care coaches. A total of 960 converted coaches as COVID care centres to be used for very mild/mild cases have been deployed for 5 states i.e. Delhi, Uttar Pradesh, Andhra Pradesh, Telangana and Madhya Pradesh and Indian Railways has geared up to provide its 5231 coaches.¹⁴

Masks (2 ply and 3 ply surgical masks, N95 masks) and hand sanitizers have been notified as essential commodities by government under the Essential Commodities (ECs) Act, 1955 up to 30th June, 2020 by amending the Schedule of the Essential Commodities Act, 1955. An advisory has also been issued under the Legal Metrology Act, 2009 by Central Government. The States may take action against the offenders under the EC Act and offenders may be punished with an imprisonment upto 7 years or fine or both. The decision was to empower the Government and States to regulate production, quality, distribution and to smoothen the sale and availability of these items.¹⁵

Government has been regularly reviewing the situation to ensure adequate supplies of health products to the patients. The 15th meeting of the high level Group of Ministers (GoM) on COVID-19 was held on 15th May 2020 and was informed that as on 15 May 2020, a total of 8,694 facilities comprising of 919 dedicated COVID hospitals, 2036 COVID Health Centres and 5739 COVID Care Centres with a total of 2,77,429 beds for severe and critical cases, 29701 ICU beds and 5,15,250 isolation beds in care centres, are available. Also, 18855 ventilators are now available to combat COVID-19 in the country.

The centre has also provided 84.22 lakh N95 masks and 47.98 lakh personal protective equipments (PPEs) to the States/ UTs / Central Institutions. GoM was also informed that domestic manufacturers have reached the production capacity of nearly 3 lakh PPEs per day and about 3 lakh N-95 masks per day which is sufficient to meet the requirement of the country in the near future. Domestic

manufacturers have also started manufacturing of ventilators and orders have been placed.¹⁰

Medical personnel working in isolation areas and intensive care units use personal protection equipment (PPE) kits to protect them from acquiring infections. There are specific standards to be maintained to ensure the safety of the personnel wearing PPEs against COVID-19. Such specific PPEs were not being manufactured in the country. The Government of India made proactive efforts to promote their manufacturing in the country with the prospect of huge requirement of PPEs arising in the near future. Ministry of Textiles and Ministry of Health and Family Welfare have been working together in this endeavour. Domestic manufacturers rose to the occasion and the manufacturers clearing the quality tests are being given orders. COVID-19 patients tend to develop acute respiratory disease syndrome (ARDS) due to which there is a growing need of ventilators also.¹⁵

E-initiatives

Dr. Harsh Vardhan also said that ‘research work should continue in dynamic mode simultaneously with COVID-19 management efforts’. He exhorted the scientists, that India should rise to the occasion and develop solutions not only for India but also for the world.

Government of India launched online data pool of critical human resource for combating and containing COVID-19. The dashboard contains state wise and district wise availability of the large pool of human resources for various activities to fight COVID. States, UTs and Local bodies have been called upon to utilise the online platform for human resources. Training of healthcare professionals through online modules on iGOT platform has been emphasised.¹⁶

As a prominent preventive measure, the Union Government has earlier launched an application called Aarogya Setu developed by the Ministry of Electronics and IT. It enables people to assess themselves the risk of their catching the Corona virus infection. The risk is calculated based on the interaction with others, using cutting edge bluetooth technology, algorithms and artificial intelligence. This is designed to keep a user informed and Government can take timely steps and initiate the isolation procedure if necessary based on the data. The app is available on both Google Play (for Android phones) and iOS app store (for iPhone) and is available in 11 languages. “Aarogya Setu Interactive Voice Response System (IVRS)” has been implemented across the country for citizens with feature phones and landline under the protection of Aarogya Setu. This is a toll-free service, where citizens are asked to give a missed call to the number 1921 and they will get a call back requesting for inputs regarding their health. AarogyaSetuMitr has been developed under the leadership of NITI Aayog and Principle Scientific Adviser, GoI. It brings online telemedicine and medical

consultations (call and video), home lab test and ePharmacy and has voluntary participation from organizations, industry coalitions, and start-ups.¹⁷

A National Healthcare Supply Chain Portal, Aarogyapath, to provide real-time availability of critical healthcare supplies has been launched (<https://www.aarogyapath.in>). The web-based solution, would serve manufacturers, suppliers and customers with a vision of “providing a path which leads one on a journey towards Aarogya (healthy life)”.¹⁸

Telemedicine

In India, there are a lot of imbalances and bottlenecks in terms of healthcare infrastructure, which include uneven quality and access to health services. Telemedicine is an enabler of healthcare access and affordability. Ministry of Health and Family Welfare (MOHFW) and NITI Aayog released the guidance on “Telemedicine” to boost clinical performance and support decisions in the context of optimising service delivery, in line with WHO recommendations. Healthcare professionals who are in the frontline response to the COVID-19 pandemic are at the highest risk of infection. Hence, adopting telemedicine can help minimise this risk by reducing the number of personal interactions. The government is committed to provide equal access to quality care to all and digital health is a critical enabler for the overall transformation of the health system. Hence, telemedicine in health systems has been mainstreamed specifically during COVID-19 pandemic to minimize inequity and barriers to access.¹⁹

Guidelines

The Ministry of Health and Family Welfare has issued various guidelines to address the needs of citizens, and health care professionals on testing protocols, sanitation, preventive measures, rational use of PPEs, mask use etc.; guidelines to address the preventive measures for spreading COVID-19 during the unlock phase, travel advisories, training material and awareness material including short videos, posters on a dedicated website. The guidelines are revised timely and as per the need of hour. Recently revised testing guidelines for COVID-19, guidelines on preventive measures to contain spread of COVID-19 in workplace settings to deal if suspect or confirmed case of COVID-19 is detected in these settings, revised Clinical Management Protocol: COVID-19 have been issued. All authentic and updated information on COVID-19 related technical issues, guidelines and advisories can be accessed at: <https://www.mohfw.gov.in/>.

Central Drugs Standard Control Organization (CDSCO) has developed a Rapid Response Regulatory Framework for COVID-19. Central Drugs Standard Control Organization has been providing support for rapid approval regarding Diagnostic Kits (Rapid/CLIA/ELISA

kits approved for testing of Covid-19 with the conditions, PCR Kits), clinical trials for drugs. CDSCO has also extended WHO GMP COPP certification in light of COVID-19, CDSCO has been providing support for regulatory pathway for R and D of Drug or vaccine for COVID-19, Regulatory pathway for R and D of IVD kit for diagnosis of COVID-19.²⁰

Indian Pharmacopoeia Commission has successfully developed the IP reference substance (IPRS) of hydroxy-chloroquine sulphate which is available for sale and distribution from IPC. Pharmacovigilance Programme of India has issued an advisory for reporting ADRs due to hydroxychloroquine in COVID-19. The prophylactic use of hydroxychloroquine has to be coupled with the Pharmacovigilance for the adverse drug reactions through the self-reporting using the Pharmacovigilance Programme of India (PvPI) Helpline/App. A suspected adverse drug reaction reporting form (for drugs used in prophylaxis/treatment of Covid-19) has been developed and uploaded on website.²¹

INDIAN COUNCIL OF MEDICAL RESEARCH (ICMR) INITIATIVES

The fundamental principle to counter any infectious epidemic is to detect, isolate, treat and manage cases early and prevent the occurrence of new cases. India has remarkably become completely self-reliant in its testing capabilities, despite starting from scratch just a few months. In the absence of an effective treatment, prevention is the best strategy, which revolves around testing. In a diverse country like India, for inclusive and equitable access to testing, optimization of resources, based on the evolving epidemic was an essential part of sustainable scaling up. As the epidemic evolved, India's testing strategy underwent iterative calibration to keep pace with the changing epidemiology and extent of infection. This ensured that access to tests was assured for risk groups that needed it the most; wasteful, unnecessary testing was avoided; and testing infrastructure was optimally scaled up without taking away resources from other key public health interventions.²²

ICMR has been involved in various areas of work ever since the inception of COVID-19 in the country. Its core areas of work are diagnostic kits evaluation/other claims, data collection and analysis, procurement, distribution and regional depots, high-level public health committee [national task force (NTF)], NTF research groups, other research studies and policy group on AYUSH and Guidance for the country to lead the research efforts.

Lab network and sample testing

As of 17 June 2020, 60,84,256 SARS-CoV-2 (COVID-19) samples have been tested and 1,63,187 samples tested in 24 hours. From one laboratory conducting COVID-19 test in January, India has very rapidly increased its testing capacity by adding over 674 government laboratories and

250 private laboratories for testing in the country. Real-Time RT PCR based testing labs being 535 (Govt: 347 + Private: 188), TrueNat based testing labs being 316 (Govt: 302 + Private: 14) and CBNAAT based testing labs being 73 (Govt: 25 + Private: 48).²³

To ramp up the testing, other testing machines like TrueNAT and CBNAAT have also been mobilized. Handholding of labs across the country through 14 AIIMS-like mentor institutions is undertaken to ensure adequate bio-safety standards and accreditation of the laboratories. To maintain steady supply of testing material to the labs, 15 depots have been created by roping in India Posts and private agencies for distribution. Many Indian companies have been supported to undertake production of testing material which was earlier primarily sourced from abroad. This has helped in maintaining steady supplies across the country.

Indian scientists are tirelessly engaged in developing indigenous diagnostics for SARS-CoV-2, the causative agent of COVID-19 since most of the diagnostic material for COVID-19 is imported into India from other countries. Indian Council of Medical Research (ICMR)-National Institute of Virology (NIV) at Pune has developed and validated the indigenous IgG ELISA test "COVID KAVACH ELISA" for antibody detection for COVID-19.²⁴

In view of the need for further increasing the testing capacity for COVID-19 at National Centre for Disease Control (NCDC), the procurement of a high throughput machine as per the recommendations of Empowered Group 2 was approved. The Cobas 6800 testing machine, which is a high throughput machine with the capacity to test around 1200 samples in 24 hours, has been installed and the testing capacity for COVID-19 at NCDC has been significantly enhanced.²⁵

Testing strategy

ICMR has been modifying the testing strategy from time to time based on the epidemiological need of the country. Strategy for COVID-19 testing in India, Version 5, came on 18 May 2020. The latest guidelines mentions testing of all symptomatic (Influenza-like illness (ILI) symptoms) individuals with history of international travel in the last 14 days, all symptomatic (ILI symptoms) contacts of laboratory confirmed cases, all symptomatic (ILI symptoms) health care workers/frontline workers involved in containment and mitigation of COVID-19, all patients of severe acute respiratory infection (SARI), all symptomatic direct and high-risk contacts of a confirmed case to be tested once between day 5 and day 10 of coming into contact. All symptomatic ILI within hotspots/containment zones, all hospitalised patients who develop ILI symptoms, all symptomatic ILI among returnees and migrants within 7 days of illness, no emergency procedure (including deliveries) should be delayed for lack of test. However, sample can be sent for

testing if indicated as above, simultaneously. ILI case is defined as one with acute respiratory infection with fever $\geq 38^{\circ}\text{C}$ and cough. SARI case is defined as one with acute respiratory infection with fever $\geq 38^{\circ}\text{C}$ and cough and requiring hospitalization. All testing in the above categories is recommended by real time RT-PCR test only.²⁶

Diagnostic kit validation

Currently there are 14 validation centres for diagnostics for COVID-19 these are ICMR- National Institute of Virology (NIV), Pune; CSIR- Centre of Cellular and Molecular Biology, Hyderabad; ICMR- National Institute of Malaria Research (NIMR), Dwarka, Delhi; ICMR- National Institute of Epidemiology (NIE), Chennai; ICMR-National Institute of Virology (NIV), field unit in Bengaluru; ICMR-Regional Medical Research Centre (RMRC), Bhubaneswar, Odisha; ICMR-National Institute for Research in Reproductive Health (NIRRH), Mumbai; Postgraduate Institute of Medical Education and Research (PGIMER), Chandigarh; King George's Medical University (KGMU), Lucknow; ICMR-Rajendra Memorial Research; ICMR-National Institute of Virology (NIV) field unit in Alapuzha, Kerala; ICMR- National AIDS Research Institute (NARI), Pune; ICMR-National Institute of Pathology (NIP), New Delhi; ICMR-National Institute of Cholera and Enteric Diseases (NICED), Kolkata.²⁷

Performance evaluation of commercial kits for real time PCR for COVID-19 has been done by ICMR identified validation centres and till 23rd May 2020, 76 RT-PCR kits have been evaluated by ICMR validation centres, and were found to be satisfactory. A list is updated on frequent intervals to give updates on the evaluation.²⁸

Research task force

The National Task Force for COVID-19 has constituted the following research groups to identify the research priorities and quickly initiate research studies. These are clinical research group, research on diagnostics and biomarkers, epidemiology and surveillance, operations research, vaccines/drug research and development.

Therapeutic trials for COVID-19

Currently, as of 25 May 2020, approximately thirty trials are ongoing in India which involves (hydroxy) chloroquine, treated mycobacterium, plasma based therapy, lopinavir/Ritonavir, remdesivir and traditional medicine. ICMR is collaborating with the World Health Organization for public health emergency solidarity trial- an international randomised trial of additional treatments for COVID-19 in hospitalised patients.²⁹

Revised advisory on the use of hydroxychloroquine (HCQ) as prophylaxis for COVID-19 infection (in supersession of previous advisory dated 23rd March,

2020)- based on the available evidence, it has been opined that HCQ is relatively safe, when certain contraindications are avoided, and has some beneficial effect as a prophylactic option.³⁰

A multi-center clinical trial, titled “a phase II, open label, randomized controlled trial to assess the safety and efficacy of convalescent plasma to limit COVID-19 associated complications in moderate disease” (PLACID trial) has been initiated by ICMR. The PLACID trial protocol has been registered with the Clinical Trial Registry of India (CTRI) and the generic protocol for this study has also been approved by the DCGI, CDSCO. The sample size of the study is 452. ICMR launched a call inviting letters of interest from sites which had the facilities to undertake the study. Expression of interest was received from 113 institutions. As of 22nd May 2020, ICMR has approved 46 institutions in the PLACID trial.³¹

Guidelines

ICMR has launched guidance for evaluation of novel applications for COVID-19; National Guidelines for Ethics Review Committee for COVID-19 research; Standard Guidelines for Medico-Legal Autopsy In COVID-19 Deaths in India (can be accessed at <https://www.icmr.gov.in/>).

ESTABLISHMENT OF A NETWORK OF BIOREPOSITORIES IN INDIA

COVID-19 has dramatically enhanced the need to promote research and development for larger public health benefit. For development and validation of new diagnostics, therapeutics or vaccines, access to different kinds of clinical samples from infected patients is an essential requirement. Currently, there is no structured mechanism for collecting and storing these valuable clinical samples. In view of this, it is important to create designated biorepositories for collecting, storing and maintaining clinical samples (oropharyngeal/nasopharyngeal swabs, bronchoalveolar lavage, sputum, blood, urine and stool) of COVID-19 patients. NITI Aayog has recently issued guidelines for sharing of bio-specimens and data for research related to COVID-19. ICMR has released a guideline that in tandem lays down the brief processes and operational mechanisms for establishing COVID-19 biorepositories in the country.³²

CONCLUSION

COVID-19 has radically transformed lives due to high transmission nature of the virus. With lack of treatment and a vaccine for Corona virus the best way is the prevention by practicing social distancing norms, use of face masks and hyperlocalization to contain hotspots and areas of high risk is the new way of life. India's decision to impose lockdown across the country to protect its citizens is unprecedented. India took every possible step to ensure containment of the virus spread. India took all

necessary steps well in time, including surveillance at points of entry, evacuation of nationals stranded overseas, massive community surveillance through robust disease surveillance network, strengthening of health infrastructure, capacity building of over two million frontline human resources, risk communication and community involvement.³³ India's policy of micro identification, mass isolation and quick treatment reaped good dividends in preventing large scale spread and deaths due to COVID-19 in initial phase. These positive results, however, should not let us lower our guard down.

Therapeutics, diagnostics and vaccines for the whole world is the only way out of this pandemic. Global collaboration and pooled resources by Governments, industry and philanthropy is the way forward. This is also an immense opportunity for India to make the nation highly efficient and competitive to penetrate global markets but would also require key reforms across sectors. Healthcare is providing many opportunities for Make in India and urged the industry leaders to participate in the intense testing time of COVID pandemic.³⁴

Government of India schemes and initiatives in the areas of pharmaceuticals and device sectors is providing such opportunities. Indian scientists are working on discovery of vaccine, drugs as well as development of cost-effective diagnostic kits and various life-saving equipment with the active support of Government of India. These should be made available in a fair and equitable manner to tackle COVID-19 to accelerate progress towards achieving sustainable development goals and universal health coverage.³⁵ India has been part of the resolution launched by World Health Organization on 'International cooperation to ensure global access to medicines, vaccines and medical equipment to face COVID-19'. The resolution calls for the universal, timely and equitable access to and fair distribution of all quality, safe, efficacious and affordable essential health technologies and products in the response to the COVID-19 pandemic as a global priority, and the urgent removal of unjustified obstacles thereto; consistent with the provisions of relevant international treaties including the provisions of the TRIPS agreement and the flexibilities as confirmed by the Doha declaration on the TRIPS agreement and public health.³⁶

The policy of India towards 'Universal Health for All' led by the dynamic and visionary Prime Minister Mr Narendra Modi is currently evident by various initiative taken by the Government of India across ministries as mentioned in the article. However, with the changing phases of the epidemic globally and in India the efforts need to be further amped up. India has the right strength and resources to fight and defeat COVID-19, and we can keep up our motivation as in the words of Dr. Harsh Vardhan, Honourable Union Minister, Ministry of Health and Family Welfare, Science and Technology and Earth Sciences “there is always a silver lining to each dark

cloud and in the present situation it is necessary to keep the spirits high, so that we can come out of it, victorious like a phoenix".³⁴

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