

TECHNOLOGY IN HOURS OF A PANDEMIC: CONFRONTING COVID 19 IN INDIA

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ABSTRACT

Today the entire world is reeling under the effects of a dreadful virus called Covid-19 and the situation of India is no different. The first confirmed case of Coronavirus was reported from Kerala in January 30th 2020. And today, after six months, the total number of cases stands more than seven hundred and sixty thousand out of which more than twenty one thousand have lost their lives. The government has imposed complete lockdowns from March onwards to curb the rapid spread of this disease, which at the same time brought immense misery in lives of millions of people. However, in these crisis situation several gifted and hardworking scientists of our nation have come up with some of the most innovative and brilliant ideas in the field of technology, that will help the Government and the people of the country in their battle against the novel Coronavirus. The present paper is an attempt to highlight some of these notable technological breakthroughs that the nation has achieved in the past few months and its effect on the combating the impact of Covid-19.

KEYWORDS: COVID 19, Technology, Pandemic, India

1. INTRODUCTION

In the past the human civilization has come across various novel diseases that had eventually taken the shape of pandemics like the Black Death, Spanish Flu, and the Justinian Plague etc. These pandemics have not only wiped out millions of population but at the same time had severe socio economic consequences which the next few generations had to face. But with the limited scientific or medical knowledge and with the smart use of common sense that people possessed at that time, they have successfully able to come out of that situation after a certain period of time. Now, in the 21st century, mankind is facing the wrath of a deadly Coronavirus that has also turned out to be one worst pandemic in human history. It was mainly originated in the Wuhan province of China in November 2019. From there, within a span of eight months, it has spread to more than two hundred countries affecting above ten million people out of which half a million have lost their lives. Scientists are working day and night to invent a vaccine to curb this disease. However, thanks to the rapid development of science and technology over the past few decades, many new instruments and devices has been developed within a very short time by various scientific institutions that are really contributing the nation in these dire times. In this paper I have tried to draw special attention to some of these technological inventions of the past few months that have turned out to be very useful for the people, working in different arenas, in their fight against the novel Coronavirus.

2. PANDEMICS AND EPIDEMICS

A disease when affects a large number of people number of people within a community, population or region is termed as an epidemic¹. And when this epidemic spread over many countries or continents then it is called a pandemic. An important common feature between the two is that most of the times the disease is absolutely new to the human society. And since the pathogens are novel, it gets the opportunity to spread very rapidly as the people are mostly unaware of how to tackle this disease. There are no medicines no vaccines and no proper cure at the time of its outbreak and the germs begins to spread like wildfire. Another important characteristic is that most of the times these pathogens are zoonotic- which means they spread from animals to humans. We have many examples of this. Rats caused the Black Death in Europe that wiped out more than two hundred million people. Even in recent times the world has come across a wide range of such epidemics and pandemics that are zoonotic- like Ebola and Nipah(both originated from bats), bird flu (H5N1/H7N9) both came from chickens, camels are the source of Middle East Respiratory Syndrome (MERS), Swine flu (H1N1) came from pigs.

Scientists are still searching for the actual cause behind the origin of the novel corona virus. Multiple theories have been put forward from various sources to point out its source : At first it was thought to have come from bats, then there was another theory which stated that it was a result of an accident at a bio safety level 4 laboratory in Wuhan city of China. Some also opined that this was a bio medical weapon developed by China deliberately because it wants to be the only superpower in the world politics. But none of these theories are definitively proven as of yet and scientists are still working on it.

3. CONFRONTING COVID 19 THROUGH TECHNOLOGY IN INDIA:

The world is currently reeling under the effects of the novel Coronavirus that has engulfed many nations across the globe, caused the death of half a million people (till July 4th 2020) and has disrupted the lives of billions. Scientists and researchers from different parts of the world are working rigorously to discover a proper vaccine or a medicinal cure for the disease but not much has been achieved till now. While on the other hand important breakthroughs have been achieved in field of technology. Various countries around the world is taking the help of technology to tackle the COVID-19 and most of those discoveries have turned out to be quite successful in easing up the situation. And in this regard India is also not lagging behind. Students and researches of various esteemed institutions and Government research labs have worked very hard and came out with their own innovations that proved to be a genuine assistance in the country's fight against the novel Coronavirus. Below are some of these inventions that scientists of India have developed over the past three months, since the outbreak of the disease in the country, that has indeed turned out to be quite helpful

Table 1: Technological Innovations for Monitoring COVID 19 in India

Sl.No.	Name	Developer	Task
1	Aarogya Setu	National Informatics Centre, India	This app uses Bluetooth and GPS of smart phone to aware its user if he/she is within the radius of six feet of a Covid infected person ² . This app also provides information and advisories regarding containment of this virus ³ . It is a joint venture of NITI Aayog and various volunteers from private sectors and universities.
2	National Monitoring Dashboard	Department of Administrative Reforms and Public Grievances, India	It was launched by the Government of India through which various grievances related to Covid-19 like quarantine facilities, violation of lockdown rules, essential supplies etc. received in Centralized Public Grievance Redress and Monitoring System, will be handled by a technical team ⁴ .
3	CoNTeC	All India Institute of Medical Science, New Delhi	COVID-19 National Teleconsultation Centre (CoNTeC) is a centre that will be active at all times where experts from different areas of medical sciences will answer the queries of specialists regarding the treatment of Covid-19 patients throughout the country ⁵ .
4	Corona Kavach	Ministry of Electronics and Information Technology and Ministry of Health and Family Welfare, Government of India	It is an app launched by the Government of India in order to trace the location of a Covid-19 patient through GPS ⁶ . Inspired from South Korea and Singapore, this app tracks the data of the user and then informs him if he/she has come across any Covid positive patient ⁷ .
5	Covid-19 Quarantine Alert System	Department of Telecommunications and Centre for Development of Telematics, Government of India	It is an app that collects data of the person who has violated the quarantine norms and will alert the local authorities. This app uses Geo Fencing Technology ⁸ .

6	Jan Aushadhi Sugam App	Bureau of Pharma PSUs of India	This app, launched by the Government of India, will help the consumers to locate the nearest Pradhan Mantri Bhartiya Janaushadhi Pariyojna Kendra to check the availability of various medicines and its price ⁹ . It will also provide home delivery services of essential medicines to patients and elderly people ¹⁰ . This app will also help the Government to maintain the social distancing norms.
7	Sahyog App	Survey of India	This app will help to collect the geotagged information of the critical infrastructure of the country in order to help the Government and public health agencies to make crucial decisions to reduce the spreading of Covid-19 in India ¹¹ .
8	PRACRITI	IIT- Delhi, India	Prediction and Assessment of Corona Infections and Transmission in India (PRACRITI) is a web based dashboard that provides a state wise and district wise prediction of Covid-19 transmission rate ¹² .
9	GARUD	Ministry of Civil Aviation and Directorate General of Civil Aviation, Government of India	Government Authorization for Relief Using Drones (GARUD) is an online portal that will obtain swift approvals and exemptions to Governmental entities for using remotely piloted aircraft (RPA) or drones ¹³ .
10.	COVID BEEP	Employees State Insurance Corporation Medical College, IIT Hyderabad and Department of Atomic Energy, India	Continuous Oxygenation and Vital Information Detection Biomed ECIL ESIC Pod (COVID BEEP), is India's first indigenous, low cost, wireless physiological parameters monitoring system for COVID-19 patients ¹⁴ . It will reduce the risk of transmission.

Table 2: Technological Innovations in Healthcare Sector for combating COVID 19 in India

Sl.No.	Name	Developer	Task
1	Scitech Airon	Scitech Park	It is a negative ion generator that can reduce up to 99.7% viral content of a room, depending upon its size, after operating for one hour ¹⁵ . This technology is developed under 'NIDHI PRAYAS' programme of the Department of Science and Technology ¹⁶ .
2	Project Prana	Indian Institute of Science, Bengaluru	The scientists and students of Indian Institute of Science have developed a prototype of an indigenous ventilator under Project Prana. India mostly imports ventilators from Switzerland and currently has around forty thousand of them ¹⁷ . So these indigenous ventilators will contribute in the nation's fight against COVID-19.
3	Low Cost Temperature Gun	Mumbai Naval Dockyard	A low cost IR based temperature gun has been designed by the Mumbai Naval Dockyard which will help to check the temperature of those who will enter the dockyard ¹⁸ . Moreover, with the outbreak of the Covid pandemic there has been a shortage of temperature gun and non contact thermometers in the market, thus this has proved to be an effective innovation ¹⁹ .
4	New Bio Suit	Defence Research and	This new Bio Suit will ensure the safety of

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		Development Organization(DRDO)	various frontline workers like doctors, nurses, health workers by acting as a strong wall of defence against the novel Coronavirus ²⁰ . Scientists have used their knowledge on textiles, coating and nanotechnology to prepare this suit.
5	AMBU	Department of Science and Technology (Govt of India), Wipro 3D and Sri Chitra Tirunal Institute for Medical Sciences and Technology	Artificial Manual Breathing Unit (AMBU) is a ventilator will provide pressurized ventilation to the patients, who are facing extreme difficulty in breathing, automatically ²¹ .
6	JEEVAN	Indian Railways	It is a low cost ventilator which could save thousands of lives in times of COVID crisis ²² . This product is still awaiting the approval of ICMR(Indian Council of Medical Research), after which everyday hundred of such ventilators can be manufactured ²³ .
7	Prana Vayu	IIT Roorkee and AIIMS Rishikesh	It is a low cost portable ventilator that delivers the required amount of air to the patients and also controls the rate of flow of oxygen during inhalation and exhalation ²⁴ . It costs only Rs 25000.
8	Anti Microbial Coating Technology	Jawaharlal Nehru Centre for Advanced Scientific Research	It is a first of its kind technology which can be applied on various surfaces like textiles or plastics and will help to kill the germs(including Coronavirus) as soon as it comes in contact ²⁵ .
9	COVSACK	Defence Research and Development Organization(DRDO)	COVID Sample Collection Kiosk (COVSACK) will help medical professionals in collecting samples from suspected patients without requiring PPE kits ²⁶ . Health professionals will use built-in gloves to collect the samples from the patients.
10	Ruhdaar	IIT Bombay, NIT Srinagar, and Islamic University of Science and Technology	It is a low cost ventilator that uses locally available material to fight against COVID-19 ²⁷ . Its cost of production is Rs10000.
11	HCARD	Council for Scientific and Industrial Research, Durgapur	Hospital Care Assistive Robotic Device(HCARD) will mainly help the frontline COVID workers to maintain social distancing from infected patients ²⁸ . This device can also serve food and collect samples from the patients.
12	ATULYA	Defence Institute of Advanced Technology, Pune	It is a microwave steriliser which will use differential heating, in range of 56 to 60 degree centigrade, to break down the coronavirus ²⁹ .
13	ECovSens	National Institute of Animal Biotechnology, Hyderabad	It is a Biosensor that can be used to detect the Coronavirus by using saliva samples ³⁰ . The lens of this device takes merely ten to thirty seconds to detect the virus.
14	UV Blaster	Defence Research and Development Organization(DRDO)	It is an Ultra Violet based sanitizing tower that will be used to disinfect those areas or objects where chemical sanitizers cannot be applied like any electronic equipments or computers ³¹ .
15	NSAFE Mask	Nanosafe Solutions (IIT-Delhi)	It is a triple layered antimicrobial mask to combat covid ³² . This mask is very cost effective and can be washed up to fifty times.

			This also helped to tackle the general paucity of masks in the market since the outbreak of the pandemic ³³ .
16	DHRUV	Research Centre Imarat (DRDO)	Defence Research Ultraviolet Sanitizer(DHRUV) is an ultra violet cabinet that provides 360 degree exposure of ultra violet rays and sanitize mobiles, laptops currency notes, bank challans, passbooks etc ³⁴ .
17	Swasthvayu	National Aerospace Laboratory	It is a Non Invasive BiPaP ventilator that will help to treat Covid -19 patients ³⁵ . It is developed in a record time of just thirty six days. This device has the facility of connecting oxygen concentrator externally ³⁶ .
18	COBAS 6800	Roche Diagnostics	It is India's first automated COVID-19 testing machine. This machine is capable of testing over 1200 samples in 24 hours ³⁷ .
19	Coro-bot	Pratik Tirodkar (An engineer from Thane, Maharashtra)	It is a robot which will fulfil the hospital needs that are treating Covid-19 patients ³⁸ . It can dispense food water beverages and also gives good advises to patients ³⁹ .
20	ARPIT	Indian Air Force	Airborne Rescue Pod for Isolated Transportation (ARPIT) is mainly designed to evacuate patients suffering from serious diseases like COVID, from remote areas ⁴⁰ .
21	GermiKlean	Defence Research and Development Organization(DRDO)	It is a sanitizing chamber developed to sanitize the uniforms of security personnel ⁴¹ . Within fifteen minutes it can sanitize upto twenty five pairs of uniform ⁴² .

4. RESULTS

We all know that “Necessity is the mother of Invention” and now the time is such when invention, especially in the medical field, is more urgent than ever. Developing countries like India has very limited medical infrastructure and it is not certainly adequate enough to tackle a pandemic like COVID-19. But still it is fighting back and has been able to control its spread to quite an extent. And all of this is because of the brains, the ideas, the determination and spirit of the citizens of India. The remarkable application of technology that led to the development of many types of equipment has steadily contributed in India’s fight against COVID. From masks to ventilators to apps- in whichever domain it is possible, we can see, efforts have been made to ease up the life of not only the frontline health workers, doctors, nurses but also the general public.

5. CONCLUSION

It should be kept in mind to at least try to make these technological innovations as much cost effective as possible. Some of these innovations are but not all of them. This should be an important consideration keeping in mind the financial condition of the people of India after spending a lockdown form nearly three months. Many of them have lost their jobs and prices of various essential commodities and even services have been raised to overcome the losses that have incurred during the lockdown period thus bringing more misery in the lives of the people. Even though the Government the trying to tackle this price rise, it is not very successful in every arena. The need of the hour is massive breakthrough in the field of medical science. If a vaccine or a proper medicine could be discovered to treat this disease then the world could be saved from further disastrous consequences. But alongside this, further technological breakthroughs in medical fields are equally necessary, be it masks, ventilators, personal protective equipments, sanitizers, and at the same time it is important to make those items or facilities, affordable to the public in general and should not burn a hole in their pockets while availing it.

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