A Review on COVID-19 Genesis and Progression in India

Sofia Pilli* and Prabhakara Rao Dasari[1]

Department of Biotechnology*
Indian Institute of Technology, Roorkee, Uttarakhand

Department of Chemistry[1]
Sam Higginbottom University of Agriculture, Technology & Sciences,
Allahabad-211007, India.

*Corresponding Author
Dr. Sofia Pilli
Department of Biotechnology,
Indian Institute of Technology,
Roorkee, Uttarakhand.
Contacts
Email: ***Personal mail**: sofia.nitrkl@gmail.com
***Institution mail**: sofiadbt@iitr.ac.in

Dr. Prabhakara Rao Dasari[1]
Department of Chemistry,
Sam Higginbottom University of Agriculture, Technology & Sciences,
Prayagraj - 211007, India.
Contacts
Email: ***Personal mail**: prabhakararao1986@gmail.com
***Institution mail**: prabhakara.rao@shiats.edu.in

Abstract

India awakened in the midst of news regarding the rise of an epidemic called Covid19 had a full blown in China by identifying its first case by end of February in the state of Kerala in case of students returned from Wuhan. This is the origin that took its pace by mid of March by many tourists from Italy and from people with a travel history to Italy, Germany and Spain. By then the epidemic had crossed China, entered other countries at full speed and transformed in to a pandemic by end of March 2020. SARS-CoV-2, Severe Acute Respiratory Syndrome coronavirus2 is the virus that causes COVID-19 (Coronavirus disease 2019), where the first transmission of this virus occurred to humans from bats. This was first identified in Wuhan, China on early Dec 2019, and has been the resulted pandemic which is continuing throughout the world for the past four months. Creating a havoc in unprepared world this virus had caused half million deaths so far with 5.5million cases recovered with more than 10.2 million active cases. This review is a brief report of how Covid19 originated and progressed in India within a span of four months from March 2020 in concordance with WHO periodical reports. This also includes how Indian Government systematically dealt with covid by taking stage wise lockdown periods to control the transmission rate and also discusses about introduction of drugs like hydroquinone and remdesivir to decrease the fatality rate.

Keywords: Coronaviruses, SARS-CoV, MERS-CoV, COVID-19

1. Introduction

The world has faced a health hazard that has never been seen before. The World Health Organization has announced the unknown Coronavirus species (1) which caused this pandemic as SARS-CoV-2. Coronaviruses belongs to a large family of viruses, out of them only few species cause sicknesses in individuals and others cause sickness bats, cats and camels (2-4). Initially China has notified the WHO about the cases of the acute respiratory disease surge that appear to be linked with an open livestock and seafood markets in the Wuhan City, suggesting transmission of virus from animals to humans. Mode of transmission is mainly through respiratory droplets, similar to other viruses, in case of influenza, cold and various coronaviruses like as SARS and MERS. The novel coronavirus responsible for this outbreak is recognized as the 2019-nCoV. (7-8)

Currently the virus is known to have reached India. In India at present there were 7, 06,897 cases recorded. Initially it was so unclear how infectious the virus is among humans. This paper aims to provide an insight how actually this pandemic sporadically increased from few cases to 0.7 million also includes up-to-date information about this pandemic that would be helpful for scientific community for better understanding of evolution of covid19 in India. We are aware that new studies are published on a daily basis; thus, online information sources, including this report will be useful for researchers, medical staff workers and government body to assess and take necessary steps to control the situation.

2. *COVID-19*

2.1. What is COVID-19?

COVID-19 or Coronavirus disease 2019 is the name of the disease caused by a new coronavirus species, Severe Acute Respiratory Syndrome coronavirus 2 (SARS-CoV-2) - a novel coronavirus which is formerly called 2019-nCoV. First case found in Wuhan, China on Dec 31st
, 2019, later after 2months this was declared as global pandemic by WHO on Mar 11, 2020 as resultant cases were found worldwide. (10)

2.2. Origin of COVID-19?

Reports given by WHO claim that first viral transmission of the novel *Coronavirus* (nCoV) originated at Seafood Market of Wuhan city where domestic animals along with exotic animals are traded on 31st December 2019. (10-11) Because of this Due to the emergence of this unknown pneumonia like epidemic of an unknown organism China had been the centre of attention of the global consideration. Later on 7th January 2020 China announced about new virus as the cause of this disease. (12-13)

The Coronaviruses are viruses are large family of viruses that usually circulate among different animals with only some of them also known to infect human beings. Mostly mammals and bird species are

the regular hosts of these viruses co evolving during the course of time. These viruses can cause various illnesses from common cold to even lethal upper respiratory syndrome in humans. First ever found human infection of these coronaviruses was identified as SARS Cov originated in south china during Nov 2002 to July 2003. (14-15) It was believed to be a zoonotic transmission from vertebrate animal to humans. This however later confirmed by sample analysis of virus strains isolated from Himalayan civet cats, raccoon dogs and ferret badgers available from local market of Guangdong, China. Because of this outbreak 8437 cases recorded worldwide with 813 deaths. The second coronavirus infection seen in humans was termed as Middle East Respiratory Syndrome, MERS caused by a coronavirus species that causes respiratory syndrome, the virus species called by name MERS-CoV, first case found in Saudi Arabia by 2012 and later South Korea by 2015. Humans were infected from sick camels as carriers, though coronavirus transmission believed to be originated from bats to camels. By the end of Jan 2020, there were 2519 confirmed cases of MERS with 866 associated deaths. (13, 16-17)

2.3. Comparative characters of SARS and COVID-19

Coronaviruses past and present

Though SARS, MERS and COVID-19Nare caused by coronaviruses, each of the three new coronaviruses have caused respiratory disease related outbreaks in the world with unique features of their own. Although the number of cases is exponential in case of COVID-19 fatality rate was significantly high in SARS and MERS. This is due to highly infectious nature of COVID-19 that spreads more easily among humans compared to other two. The deaths caused from COVID-19 outnumber that resulted from SARS or MERS cause of its rapid rates of infection throughout the world inspite of lower fatality compared. (17-19, 26) SARS, MERS and COVID-19 Coronaviruses past and present in table 1.

SARS

SARS is a Severe Acute Respiratory Syndrome caused by coronavirus SARS-CoV. The first ever cluster of SARS cases were found in November 2002 at Guangdong province located in China. Sample analysis has identified horseshoe bats belong to family of Rhinolophidae family as a natural reservoir of this source coronavirus. A zoonotic transmission i.e virus from animal to human transmission was supposedly followed from eating civet cats and other animals available in wet markets. After receiving a report by the Chinese Govt regarding 105 deaths and 400 cases caused by this virus, WHO announced a global alert of an abnormal pneumonia like syndrome and named it as SARS for the first time. Also, declared an emergency travel advisory with regulatory measures on international travel. SARS officially declared as epidemic, since then there are few outbreaks found worldwide. (20-22)

MERS

MERS is an infectious disease caused by coronavirus, as it was mostly clustered in Saudi Arabia named as Middle East Respiratory Syndrome. This new coronavirus was isolated from an infected man of above 60 years' age who had died of this virus on September 20, 2012. A total of 27 countries have reported confirmed cases of MERS since then within the span of a one month, the cases of the new outbreak increased across the globe, though most of them are from Middle Eastern countries. Since in most cases infection was caused due to direct or indirect contact specifically with Somali or Arabian camels, MERS also recognized as transmitted through zoonotic transfer. (23-25)

COVID-19

New COVID-19 disease is caused by a novel coronavirus species. As this virus also targets and infects upper respiratory tract by causing severe acute respiratory syndrome as in case of SARS, the name of the causative virus was called as SARS-CoV2. Though the initial case found in Wuhan, China, in December 2019, this disease had crossed China and similar cases were found across the globe in a time span of less than a month. On January 5, 2020, the World Health Organization declared its first news about the outbreak of unknown cause and by the end of January 2020, declared as a health emergency and cautioned the world to be prepared. This disease was termed as COVID-19 on 11th Feb 2020 based on causative organism and year of occurrence. After a month later i.e. in March 2020, this new Coronavirus caused disease declared as pandemic as cases rose in every country. World countries had awakened by the dawn of this infectious disease with no drug available had responded in introducing lockdown as social

distancing measures to curb infection rates as it was found to be transmitted from humans to humans. From then, research community along with pharmaceutical companies sincerely working hard to their limits to find a solution through a new drug or vaccine to save many lives. (17-19, 26-28)

Table 1. Comparisons of among SARS, MERS and COVID-19

	SARS	MERS	COVID-19
Pathogen Name	SARS-CoV (SARS	MERS-CoV	SARS-CoV-2
Total Cases Recorded	8,439, 21	2,519	13.3million
Total Deaths Confirmed	812	866	581,634
Fatality rate world wide	9.6%	34.3%	3.4%
Mode of transmission	Droplets from mouth while coughing, sneezing, talking, or breathing	Contact with infected camels directly or indirectly, human to human transmission by droplets from mouth and nose.	Droplets from mouth while coughing, sneezing, talking, or breathing. Touching the contaminated surfaces, since it is air borne even inhaling contaminated air with virus particles.
Mean incubation period	5-7 days		7-14 days, but not in case of asymptomatic patients.
Primary symptoms	Starts with a dry cough combined with fever and diarrhea in first week of infection.	Shortness of the breath with low fever and a cough.	Symptoms are varied from person to person according to health condition and severity at the time of infection. But mostly with a fever (85%), dry coughs (70%), shortness of breath (43%) but not always.
Age groups prone to infection	Found in people with underlying the medical conditions	Men above age of 60, particularly those with underlying medical situations such as diabetes, high blood pressure, and kidney failure	Adults aged 60 and over with children of all age groups, and people of all ages with the underlying medical conditions such as diabetes, kidney failure and high blood pressure
Treatment/Cure	No specific treatment due to unavailability of specific drugs, only method is to reduce symptoms	No specific treatment due to unavailability of specific drugs, only method is to reduce symptoms	No specific treatment due to unavailability of specific drugs, only method is to reduce symptoms
Vaccine Availability	No vaccine yet	No vaccine yet	No vaccine yet

Transmission of COVID-19

Though initial transmission was believed to be through zoonotic transfer of virus from animals to humans, later human to human transmission make COVID-19 cases propagate worldwide very rapidly in

millions within a three-month period. There is no proven data to calculate the spread between individuals but based on the particle number produced one to thousands can be infected from a single virus infected individual. Recent report by WHO claims that the virus is airborne and is confirmed by its accelerated mode of transmission. (29-30) People with close proximity with infected are likely to get most infected by the respiratory droplets released from mouth while talking, sneezing and coughing or when people come in contact with contaminated air or even touch the surfaces. It was also believed that even an asymptomatic person containing virus may infect others at a very high numbers. The expelled virus particles can stay being alive on surfaces based on type, metal (5days), wood (4days), steel (3days), glass (5days), plastics (2-3days), cardboard (24hours), copper (4hours), aluminum (2-8hours), ceramics (5days) and paper (5days). By this even touching the surfaces that had virus can have a high chance of getting infected. (31-32)

2.4. Infectious Period of COVID-19

The incubation period may vary from 7-12 days in mild and up to 14 days in case of severity before any symptoms show up, but individuals are most infectious at this asymptomatic state. Chances of infection will be more even when these symptoms are minor or less according to data. Only 20-30% cases were monitored under medical staff of total infected cases and rest were treated from home itself. From initial data available from European countries only 4% were found to have critical infectious condition in total. Rate of hospitalization were great in cases of people of 60 years' age or above and also those individuals with certain basic conditions of well-being. (33, 12)

3. Medical information

3.1. Infection of COVID-19

Data reveals there are no generalized symptoms for COVID-19 till found, they differ widely from person to person based on their physiological age and underlying health conditions. There are some infected cases with asymptomatic nature resulting in being recovered to sudden death. With these myriad traits it's been difficult to diagnose and treat infected patients beforehand. Primarily some features seen majorly out of many are general body weakness, throat pain, fatigue, fever, muscle pains, diarrhea. And sometimes in most severe and dangerous cases are sepsis, septic shock, acute respiration distress syndrome problem, severe respiratory problem and also potentially lead to the death. (34-35) The reports are appeared that medical weakening can happen quickly, frequently amid the moment week of malady. Recently partial or complete loss of sense to smell or anosmia also added as a new symptom in the infection of COVID-19 mostly in advanced condition with devoid of other symptoms. (36-37)

3.2. People group effected with COVID-19

People with 60 years' age or over with basic health problems (e.g. chronic respiratory problems like asthma and bronchitis, obesity, cardiovascular ailments, cancer and diabetes are known to be at extra risk of experiencing serious symptoms. (38) The men under these health conditions often tend to stand at a significantly developed hazard than the females. The children account for a very less number of the testified COVID-19 effected cases; below 10 years' age children are less than 1% and 4% below age 10-19. (39) The children seem to be affected as likely as adults to be diseased, but have a much lesser risk of the developing signs than adults. There is still some doubt regarding the transmission of more asymptomatic or slightly symptomatic infection by children. (40-41)

There is limited scientific evidence of seriousness of the disease in the pregnant women following COVID-19 infection

1. No losses in pregnancy, no maternal deaths and only one stillborn death reported.
2. There is currently no evidence to suggest that COVID-19 infection has a negative effect on the fetus during pregnancy.
3. There is currently evidence of COVID-19 transmission, during pregnancy from mother to baby. Like this one case has been confirmed, and this is the only neonatal COVID-19 event had been informed so far. (42)
4. However, all prenatal women must follow similar wide-ranging precautions for COVID-19 disease prevention, such as avoiding contact with sick people, regular hand washing and self-isolation in case of any unhealthy symptom. (43)

3.3. Current Treatment or Cure for the COVID-19 disease

At this time no exact method or medicine present for the treatment of COVID-19 ailment. The healthcare workers are regularly using a symptomatic approach, where they treat according to symptoms observed and try to alleviate without targeting the virus since there is no specific antiviral drug available to Covid-19. In most crucial cases of ICU supplying oxygen to aid the patients with difficulty in breathing and fluid resuscitation to manage body fluids are the two major interventions used to reduce morbidity, and provide supportive care using oxygen therapy and fluid management in case of severely infected people which can be extremely effective. (18) Drugs like hydroxychloroquine, remdesivir are being used to reduce the fatality rate so far confirmed by their results. Many drugs are in clinical trials with no published results yet. (44) No vaccine is currently available for this new identified coronavirus. Although work has already been started by several research groups and biopharmaceutical companies worldwide in finding potential vaccine. Many are already in their final clinical trials it may take a month to many before a vaccine is ready for use in humans. (45)

3.4. Tests for COVID-19

There are two types of testing based on current state of viral infection in body and another is to assess condition after the infection of virus. As this test used for indication of current infection, along with these other techniques include checking for elevated body temperatures, CT scan and testing oxygen levels in blood.

Detection of the virus using RT-PCT

RT-PCR is a special type of PCR where first the RNA of virus is transcribed to DNA by using Reverse transcriptase enzyme and then obtained DNA is amplified using PCR there by detecting the presence of SARS-CoV-2. This process generally requires few hours to days. (46) But this method of testing is more reliable and as it is fully automated and high throughput. (47) Samples can obtain by throat and nasopharyngeal swabs, (48) sputum, (49) saliva and collected internal airway material. But viral count in upper respiratory samples may decline once symptoms may start to show. (50)

Isothermal amplification assays

This assay allows the amplification of virus's genome faster than PCR since there is no repeated heating and cooling cycles. This test also allows quantification of nucleic acid using fluorescent and other labeling tags with specialized machines. This Isothermal nucleic acid amplification tests are found to be cost effective as there is no need to convert RNA to DNA than PCR and easy to use. (51-53)

Antigen test

Another method is to test the presence of viral particle proteins as antigens produced in infected patients. Usually these proteins are surface spike proteins on coronavirus, (54-55) found only after infection but not prior making this test as to test the virulence but not to prevent the infection. Though test results are highly accurate, often combined with more false negatives, thus making negative results ambiguous since asymptomatic patients lack presence of enough viral particles in nasopharyngeal swabs. Advantage is to scale up testing to higher numbers where with PCR only few hundred tests are possible. (55-56)

Imaging Methods

Ground glass pattern (88%) is the most common findings observed in CT scan of Covid 19 cases. In initial cases of infection this pattern may present as a unifocal lesion located in the inferior lobe of left lung, but they usually transform in to multifocal, bilateral and peripheral with posterior predemoninance. (57-58) As scan results overlap with other health problems and absence of the above mentioned features in initial days of incubation period X-ray and CT scans are not preferred for diagnosis of Covid19. (58-60)

Serological Tests

Serology tests can identify antibodies IgM and IgG which serve as acute infection markers are usually detected only around 28 days post infection. This test gives the information about potency of virus and as well as recovery rate of patient. (61-62)

4. Prevention

4.1. What can be done to avoid getting infected?

The entry of COVID-19 virus into human body can be through the eyes, nose and mouth. So touching face, nose and eyes with unwashed hands can be strictly prohibited. Washing hands with soap for 20-30 seconds thoroughly and often sanitizing hands are recommended. And thorough hand washing with alcoholic-based products and gels in all environments is suggested. It is also recommended that people with the new COVID-19 indications or symptoms should remain one or more meters away to lower the risk of respiratory droplet infection. (36-37, 63-66)

4.2. How can it be avoided infecting others?

Wearing a mask when going outside from home and by avoiding meeting people in group's unnecessarily. (67-68) Maintaining social distancing of one or extra meters away from others to decrease risk of respiratory droplets transmitting the virus. Staying indoors unless it is a not urgent requirement. If in any case have experience of any COVID-19 symptoms should directly call to healthcare and take suggestions immediately. (12)

4.3. How and why should I do it and how to make physical distancing?

The physical distance is designed to decrease the physical interaction between persons that potentially reduces the risk of infection upon healthy people. The aim of this social distancing stands to reduce or interrupt COVID-19 spread. The term 'absolute distance' means that same as 'social distance' which is commonly used, but it defines more precisely what is used to physically keep people apart. Physical distancing steps should be introduced over a longer period of time and their effectiveness depends on ensuring that the individuals retain regular interaction with relatives, friends and colleagues from a distance. (69-71)

Therefore, Internet-based communications such as telephone and video conferences are crucial tools to ensure a successful physical distance strategy. In Whole world overall the countries have themselves imposed in place quarantine and also physical or social distancing as an effective procedure to avoid additional extent of the COVID-19 virus. Those activities may include closure of educational organizations and places of work in whole or in part. Limit visitor numbers and limit contacts between residents of these closed and confined settings like prisons and long-standing care mass gatherings and smaller meetings are prohibited, cancelled and restricted. Quarantine being mandatory for buildings or residential areas by strictly following the internal and external boundaries. (72-74)

5. COVID19 in India

In 2020 on 31st January 1st report announced in India, on 30th January a research laboratory was confirmed 1st case of COVID-19 was found in Kerala. WHO general director confirmed that epidemic situation of the novel (2019-nCoV) coronavirus. Around 9720 cases confirmed and 213 deaths have been reported in China, the epicenter of the outbreak was initially in the Wuhan City, Hubei area but it has quickly extended to entirely the other provinces of the China. The patient is a student recurring from Wuhan, China had been kept under constant monitor under care of medical staff in isolation ward in special hospital. The MoHFW was carefully checking 2019-nCoV situation. National Institute of Virology, Pune, prepared with worldwide values of knowledge and volume, has been challenging samples of COVID19. (75-77)

As on 06th February 2020 in 2nd report, a total of 1108 flights have been separated to cover a total of 121 000 passengers. The screening of travelers started nearly in 21 airports, international seaports and from border country particularly with Nepal. Presently over 6000 passengers from 29 States/UTs are under home quarantine. Between 30 January and 3 February 2020, MoHFW long-established three cases of

COVID19 in Kerala. As of 5thFebruary 2020, 901 trials have been verified of which only 3 were tested positive. These infected patients were stable and are fully observed in hospital isolation. The MoHFW has preferred and also ICMR-NIV, Pune, as the nodal center for organizing diagnostics for the new Corona cases. Additionally, 11 laboratories had been prepared and also trained, and they now have started analysis samples. (78-80)

The NIV and ICMR laboratories the apex laboratory on behalf of reconfirmation of any positive samples as well as for the quality assurance of the testing of samples for COVID-19. In addition, 13 Viral Research and Diagnostic Laboratories (VRDLs) and National Centre for Disease Control (NCDC), New Delhi are performing tests for the COVID-19. As of 12th February 2020 in 3rd report, 1725 samples have been confirmed of the 3 positive cases. (81-82)

As of 20th February 2020 in 4th report, a total of 914 people are placed under surveillance, 907 are under home isolation and 7 are admitted in isolation facilities. Till date, 433 samples had been tested with 423 negative cases, 3 positive and results of 7 pending. In Kerala, the situation has stabilized with all the three patients have recovered and discharged from the hospital and are now under home isolation. However, the state remains on guard and the surveillance strengthening, contact tracing, isolation and response activities are ongoing. (83-84)

The ICMR and NIV labs had informed that a over-all of 2880 samples have tested as on 27th February 2020 in 5th report. 1572 samples were referred from suspected cases throughout the country except those from the quarantine centers, till date, three tested positives for COVID-19. In Kerala more people were released from isolation reducing the total people in isolation to just 127 out of which 5 are in hospital. Of the total 444 samples sent for testing 3 were positive, 436 were negative and results for 5 as pending. (85-87)

On 9th March 2020 in 6th report, a stock of the PPEs and also N95 face masks are preserved by the states as healthy-well by Government Union. On 06 March, the HFM chaired an advanced meeting with the corporate hospitals in the Delhi-NCR for the attractive them for the COVID-19 new virus management. Discussions focused on preparing for surge in terms of bed capacity of hospitals for infected cases, isolation wards, etc. through private sector alliance done. Protocols for sample gathering and analysis were made jointly with all private sector based labs. In order to highlight the attentiveness regarding spreading of this new virus, a special new disease COVID-19 mobile phone caller tune, social media, news media, print media etc, had been inaugurated and were effectively employed. (88-90)

As of 14 March 2020 in 7th report, there are 52 laboratories recognized by the ICMR, for sample collection and testing of COVID-19 virus. As per a letter from the Ministry of Home Affairs, 4 lakh of ex gratia will be given to the families of those whose deaths have been linked to the COVID-19. In addition, the cost of hospitalization for those being treated for the virus has been fixed by state governments, from the Disaster Response Funds (SDRF) of each state. (91-93)

As on 22nd March 2020 in 8th report the PM Modi called for the 'Janata curfew' on 22nd March from the 7 AM - 9 PM, urging people to stay home and stay safe but excepting those in necessary services, applying public should follow social distancing between intercessions. The logistics for COVID-19 management particularly masks and hand sanitizers, Government has alerted an order under the Essential Commodities, EC act, 1955 as to announce these matters as ECs up to the 30 June. Due to outbreak COVID-19, all the train, metro rail, flight, vehicle services and interstate passenger transport totally stopped. The medical officers, government health institutions and private medical practitioners including the AYUSH practitioners to now notify COVID-19 affected person to concerned district surveillance unit**.** (94-96)

As of 28th March 2020 in 9th report of MoHFW, a whole of the 909 COVID-19 virus effected cases (862 of Indians and also foreign nationals are 47 people) have been informed in the areas of union territories, 27 states (80 who have been cured/ discharged with 19 reported deaths). India's reply to the COVID-19 virus has been preventative, active and also graded with high-level political commitment and a 'whole government' method to respond to the COVID-19 virus cased pandemic situation. WHO office of India is employed carefully along with Ministry of Health and Family Welfare (MoHFW) to support surveillance, build the capacity of well-being system and optimize 'window of the opportunity' created by the mandatory physical separation in India. (97-99)

As of 5th April 2020 in 10th report, according to MoHFW, an over-all of 3577 COVID-19 cases, (with 65 foreign nationals) had been informed in 29 states and also union territories areas. These consist of 274 who had been cured and also cured and sent back to home with 83 deaths. The Indian government was launched Arogya Setu mobile app on 2ndApril 2020 through public-private partnership to educate the people about danger situation of the COVID19 and assess risk factors of new virus infection. (100-103)

As of 12th April 2020 in 11th report, conferring to MoHFW, a total of 8,447 COVID-19 test cases have been conducted in 31st states and union territories. These consist of 765 who have been cured and 273 deaths. The PMO sanctioned INR 15,000 crore as Emergency Response and Health System Preparedness Package and 7,774 crores for immediate response. WHO is supporting Government in assessment of Dedicated COVID-19 hospitals especially for treatment of infected patients? As of now, GoI has set up more than 550 dedicated facilities with >1lakh isolation beds and >11,000 ICU beds. MHA affairs has directed all the UTs/states to make available all needed services like police security, doctors and also medical officers and staff undertaking surveillance, detection, quarantine facilities make available. WHO is working with the National AIDS Research Institute (NARI-ICMR) for India to join WHO solidarity trial. (104-107)

As of 12th report given to MoHFW on 19th April 2020, total of 16,116 cases of COVID-19 confirmed including in all 32 states and union territories. In light of the COVID-19 situation on consultation with states PM announced the extension of the national lockdown in India till the 3rd of May. WHO is also supporting MoHFW to further strengthen the ongoing surveillance and response based on transmission scenarios & testing of more cases. ICMR is working on the Phase II, open-label study, randomized controlled trial to assess the safety and effectiveness of convalescent plasma in limiting COVID19 virus associated complications. DG ICMR / Secretary DHR are planning to conduct a "COVID-19 sero-prevalence survey in 82 districts in 25 states" in collaboration with WHO assistance survey. (108-109)

As of 26th April 2020 in 13th report, a total of 26 917 COVID-19 virus effected cases in 32 states or union territories, including 5913 cured/discharged, with 826 deaths. Active cases: 20 177. Union Minister along with WHO representative participated in a virtual interactive session with the health ministers of member states. The WHO has been sharing actions being taken for the containment of COVID-19 effected people in India. PM of India stressed "the crisis rising out of the COVID-19 has been turned into an opportunity to strengthen healthcare distribution system in country. The ICMR had evidently laid down the purpose, scope and also usage of speedy antibody tests by continuously emphasizing that vigorous testing are required for diagnosis of the COVID-19 contamination. (110-111)

As of 03rd May 2020, a total of 10,887 individuals had been completely cured. The total numbers of confirmed cases are now 40,263. WHO is providing kits and reagents to COVID-19 testing laboratories through ICMR to partly meet their huge testing requirement and so far, a total of 1,046,450 samples had been tested. (112)

As of 2020 May 10th, here were 41,472 live cases, 19,357 cured and relieved and 2109 deaths in India. WHO Country Office for India and MoHFW both are closely observing taking actions on preparedness and also on immediate dealings for COVID-19.WHO provided inputs to develop the joint UN socio economic response plan for COVID-19. WHO continues dialogue with FICCI on private sector's health activities for COVID-19. The total of 1,609,037 samples have been tested. WHO also is facilitating designation of a Government Laboratory in India as a Global Reference lab for COVID-19. ICMR is leading efforts on setting up on environmental surveillance and discussing with various agencies and states on initiating testing of sewage for SARS-CoV2[58]. (113, 111)

As of May 17, 2020, India's standard time at 8:00, India had 53,946 live cases, 34,109 rehabilitation/discharge/migration, and 2,872 deaths. As of May 14, 2020, India has improved its analysis capabilities, performing 1,00,000 trials per a day, and has 500 laboratories are more in India, 359 governments including and also 145 private laboratories. Published by the National Research and Development Corporation (NRDC) "Technical Compendium of India against COVID-19 (Tracking, Testing and Treatment)". (114)

As of May 24, 2020, India's International Standard Time at 8:00, India had 73,560 more active cases, cured 54,440 and also discharged, 1 migrated, and 3,867 deaths. The 73rd World Health Assembly (WHA), focusing on COVID-19 pandemic management, adopted a resolution for comprehensive and

independent evaluation is needed of the international reply to the pandemic. WHA ended with a global commitment to the COVID-19 response. The delegates passed a landmark resolution to unite the world to fight the COVID-19 pandemic. (115, 111)

As of May 31st 2020 India had 89,995 active cases, 86,983 discharged, 5,164 deaths. The Ministry of the Interior (MHA) has issued new guidelines to combat COVID-19 and unlock 1: the gradual reopening of areas outside the containment area will take effect on June 1st 2020 and will continue until June 30th 2020 June. Health infrastructure was ramped up during the lockdown. WHO supported the assessment so far, as of 27.05.20, there are currently 930 COVID special hospitals, including isolation beds are 1.58,747 ICU beds are 20,355 and oxygen beds are 69,076. 2,362 specialized COVID19 cases health centers equipped with isolation beds are 1.32,593; ICU beds are 10,903 and oxygenated beds are 45,562 have been put into operation. WHO has issued interim guidelines on the clinical management of COVID-19. This guidance document applies to doctors who care for COVID-19 patients at all stages of the disease. WHO Representative had discussions with Health Secretary and CEO, NITIAyog and advocated for enhancing COVID response in densely populated urban areas, providing flu vaccines for entire health workforce, and strengthening public health surveillance system, including the completion of case investigations forms (CIF). (116-117)

As of June 7, 2020, India's standard, India had 120,406 active cases, 119,292 cured/discharged, 1 relocated, and 6929 died. Throughout the last 24 hours, MoHFW reported total of 4,611 COVID-19 active cases patients are cured. WHO officials are supporting in containment activities, its micro planning & monitoring, community surveillance, monitoring quarantine facilities, piloting of environmental surveillance, and hospital assessment. (117-118)

As of June 14, 2020, at 8:00 U.S. Standard Time, there were 149,348 active cases, 162,378 cured and discharged, deaths of 9,195 cases in India. During the last 24 hours, MoHFW reported total of 4,611 COVID-19 active patients cured. WHO clarified in press briefing asymptomatic people can spread COVID-19, but we need more research to determine the extent of asymptomatic transmission. The investigation is ongoing, and we see more and more investigations in progress. States/UTs with active cases are being actively monitored by the CMs and senior officials. WHO continues to support all 35 States/UTs, with focus on high burden cities. (119, 117)

As on 21 June 2020, 08:00 IST there were 169,451 Active Cases, 227,755 Cured/ Discharged, 1 Migrated and 13,254 Deaths and 410,461 Confirmed Cases in India. WHO Country Office for India (WCO) continues to work carefully with MoHFW, on alertness and response measures including testing, surveillance, containment, case management and research activities for COVID-19. (120)

As on 28 June 2020, 08:00 IST there were 203,051 Active Cases, 309,712 Cured/ Discharged, 1 Migrated and 16,095 Deaths in India, details here. MoHFW issued updated clinical management protocol for managing COVID-19 cases, advising Dexamethasone as an alternative to Methylprednisolone for moderate to severe cases. Government of India, has established a state-of-the-art COVID Diagnostic Training Centre and crash course in molecular diagnosis of infectious diseases focusing on COVID-19 to help build capacity at Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), Jakkur campus. Health Minister launched 'eBloodServices' mobile App developed by Indian Red Cross Society (ICRS) who has also done record procurement of 1,00,000+ units blood during COVID-19 crisis. (121)

6. Conclusion

In this Review, we recapitulate the current information on the origin and evolution of COVID-19 in India with also confirmed by detailed and exact reports issued by WHO. This review also highlights the potential and diversity of spillover of this pandemic specifically in Indian population. By the surge in demand of testing kits for initial detection, many companies came forward along with premium institutes came forward in making and produced in a very less period really been a primary weapon in fighting. Indian GOI approved early lockdown followed by four extended lockdowns played a major role in limiting the transmission rate to a higher degree. Introducing hydroquinone and other antiviral drugs like remdesivir, Glenmark's famiflu had a great impact in lowering the fatality rate. Along with these some preventive measures issued by GOI by use of Arogya Setu mobile App had come in hand in educating people and also encouraging them to be preventive make the strategy defensive. Though India had been

successful in fighting COVID-19 so far but the aftermath of this pandemic on country's economy, education, employment and growth at higher stake. In order to overcome these a schematic and strategic approach is very much needed at this critical times to regain and restore.

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