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COVID-19 and Beyond: The Way Forward for Public Health in India

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Abstract

Pandemics have occurred from time to time, with the past and present century witnessing several pandemics of Severe Acute Respiratory Illnesses caused by influenza and coronavirus. The world is currently reeling under the pandemic of COVID-19 caused by novel corona virus named SARS-CoV-2 and India also has not been spared.

As observed earlier, large scale pandemics have grave impact on many fronts, disrupting health and other services of the country and jeopardizing lives of people. While some setbacks are imminent and unavoidable, the present pandemic can also be considered as an opportunity to make positive changes in the field of public health by improving the system and people's behaviour. This paper aims to assess various health problems that are likely to occur during and after the epidemic in India and to find ways in which the present situation can be utilized as an opportunity to our benefit and carry forward the currently implemented efforts, to bring about tangible gains in the field of public health.

Keywords: COVID-19; Pandemic; Public health; Setback; Gains; Way Forward.

Introduction

The world is currently reeling under the pandemic of COVID-19 caused by the novel corona virus named SARS-CoV-2 and India also has not been spared. As observed earlier, large scale pandemics bring about grave impact on many fronts, disrupting the health and other services and jeopardizing lives of the people, all over the world. While some such setbacks are imminent and unavoidable following the present pandemic too, the current situation can also be considered as an opportunity to make positive changes in the field of public health by improving the system and people's behaviour.

Aims and Objectives

This paper aims to assess the various health problems that are likely to occur during and after

the COVID-19 epidemic in India and to find ways in which present situation can be utilized as an opportunity to carry the currently implemented efforts forward, to bring about tangible gains in the field of public health.

Methods

Official websites of the World Health Organization, Geneva; Centre for Disease Control and Prevention, Atlanta; Ministry of Health and Family Welfare and National Centre for Disease Control and Prevention, Government of India, were referred to for various guidelines and policy measures.

The global and country data for the latest situation of COVID-19 was extracted from the COVID-2019 Situation Report of World Health Organization and official website of Ministry of

Health and Family Welfare, Government of India, respectively. Data includes magnitude of the problem as on 12th May 2020.

Evolution of the Present Pandemic

The world has been devastated by several pandemics, many of which were due to Severe Acute Respiratory Illnesses (SARI) caused by different viruses commonly belonging to two major groups viz. Influenza and Coronavirus. During the 20th century, three influenza pandemics had occurred at intervals of several decades. In the present 21st century, the first influenza pandemic had occurred in 2009-10, followed a decade later by the current COVID-19 pandemic, which has emerged as the greatest public health challenge of the current millennium. The present pandemic has its origin in China.

China

A cluster of cases of pneumonia of unknown cause was detected in Wuhan, Hubei Province in China at the end of 2019, first reported to World Health Organization (WHO) Country Office in China on 31st December 2019. China publicly shared the genetic sequence of the virus on 12th January 2020. The outbreak was declared a Public Health Emergency of International Concern (PHEIC) by the WHO on 30th January 2020. On 11th March, 2020 WHO declared the disease as a pandemic.¹

World

The first recorded case from outside China was reported in Thailand on 13th January 2020,¹ followed by Japan and Republic of Korea, reporting their first cases on 15th and 20th January 2020 respectively. All these cases had been imported from Wuhan, China. The first imported case in the United States was reported on 23rd January 2020. On 26th February 2020 the disease had spread to all regions of the WHO.²

The disease, since its first detection in China, has presently spread to over 200 countries/territories. As on 12th May 2020 10.00 CEST, total 40,88,848 cases and 2,83,153 deaths have been reported globally.³

India

The epidemic in India started as imported cases of three students who arrived from Wuhan in China, with the first person testing positive for COVID-19 on 30th January,⁴ followed by two others by 3rd February 2020.⁵ The next three cases surfaced a

month later that is on 2nd and 3rd March, rising to total of 28 cases on 4th March. The new cases included travellers arriving from abroad, their contacts and a group of foreign tourists.⁶ Since then, clusters have appeared in multiple States. India acted promptly to implement extensive measures with which many districts could be made free of the disease.

Presently 33 States are reporting COVID-19 cases. As on 13th May 2020, 08.00 IST, total 74,281 cases of which 47,480 are active cases, 24,386 cured/discharged/migrated and 2,415 deaths have been reported in the country. Highest number of confirmed cases of COVID-19 are currently reported in Maharashtra (24427), Gujarat (8903), Tamil Nadu (8718), Delhi (7639), Rajasthan (4126), Madhya Pradesh (3986), Uttar Pradesh (3664), West Bengal (2173), Andhra Pradesh (2090), Punjab (1914) and Telangana (1326), recording more than 1000 cases.⁷

Past Pandemics and Epidemics

Three influenza pandemics have occurred in the 20th century, most severe one being caused by an A (H1N1) virus, which occurred in 1918-1919, approximately a century earlier than the current pandemic. Coronavirus struck the world in the present century with Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS) that started in 2002 and 2012 respectively, which was followed by the present pandemic of COVID-19.⁸⁻¹¹ (Table 1)

Epidemiology

Coronavirus has been named from the Latin word corona meaning halo or crown, due to the spikes projecting on its surface giving the appearance of a crown. Coronaviruses are a group of RNA viruses with four main sub-groups alpha, beta, gamma and delta, which are capable of infecting humans and animals. There are four common types which can infect humans. In addition, some new types have evolved from animal sources, causing severe forms of disease in humans.¹² (Table 2) Human coronaviruses were first identified in the mid-1960s. Since then this virus has been associated with respiratory illnesses ranging from common cold to some episodes of severe forms of disease like SARS, MERS and the current COVID-19.¹²

In the cluster of cases occurring in China, a novel coronavirus was eventually identified and on 12th January 2020 China publicly shared the genetic sequence of the virus.¹ The virus was officially named as Severe Acute Respiratory Syndrome

CoronaVirus2 (SARS-CoV-2) by the International Committee on Taxonomy of Viruses (ICTV) on 11th February 2020. On the same day, WHO named the disease caused by this virus as CoronaVirus Disease of 2019 (COVID-19).¹³

Transmission of SARS-CoV-2 can occur via respiratory secretions directly through droplets or indirectly through fomites or close contacts. Asymptomatic individuals can also transmit the disease. Median incubation period of COVID-19 is 5-6 days, ranging from 02-14 days.² Common

symptoms include fever, dry cough and breathing difficulty. Some other symptoms have recently been added to the list, presence of at least two of which indicates possibility of infection with coronavirus. These are chill, shivering, sore throat, muscle pain, headache and new loss of taste or smell.¹⁴ As per available data, about 81% of cases are mild, 14% require hospitalization and 5% require critical care management. Deaths reported are mainly among elderly population, particularly those with co-morbidities.¹⁵

Table 1: Pandemics and outbreaks of respiratory illnesses in past and present century

Year	Common name	Causative organism	Country of origin	Extent of spread	Number of deaths
Influenza virus					
1918-19	Spanish Flu	Influenza A (H1N1) virus	Not known	Global	20-50 million
1957-58	Asian Flu	Influenza A (H2N2) virus	Singapore	Global	1.1 million
1968-69	Hong Kong Flu	Influenza A (H3N2) virus	China	Global	1-4 million
2009-10	Swine Flu	Influenza A (H1N1) virus	United States	Global	1-4 million
Corona virus					
2002-04	Severe Acute Respiratory Syndrome	SARS-CoV	China	26 Countries	774
2012-19	Middle East Respiratory Syndrome	MERS-CoV	Saudi Arabia	27 Countries	858
2019-20	Corona Virus Disease of 2019 (COVID-19)	SARS-CoV-2	China	Over 200 Countries	2,83,153*

* As on 12th May 2020, 10.00 CEST

Source:

WHO/Europe. Past Pandemics. World Health Organization, Europe [Internet] [Cited 2020 May 03] Available from <http://www.euro.who.int/en/health-topics/communicable-diseases/influenza/pandemic-influenza/past-pandemics>

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Table 2: Coronavirus causing disease in humans

Common coronaviruses	Other coronaviruses
229E (alpha coronavirus)	MERS-CoV (beta coronavirus)
NL63 (alpha coronavirus)	SARS-CoV (beta coronavirus)
OC43 (beta coronavirus)	SARS-CoV-2 (novel coronavirus)
HKU1 (beta coronavirus)	

Source:

CDC. Coronavirus. Centers for Disease Control and Prevention, Atlanta, USA; 2020 Feb 15. [internet] [Cited 2020 Apr 24] Available from <https://www.cdc.gov/coronavirus/types.html>

Table 3: Public health measures to combat COVID-19 epidemic in India

Containment	Management	Prevention	Other measures
Screening of travellers	Testing	Awareness drive	Legislation
Travel advisory	Triaging	Lockdown	Research
Quarantine	Case management	Social distancing	Essential health services
Isolation	Infection control practices	Hand hygiene	Care of vulnerable groups
Surveillance	Strengthening of health facilities	Face mask	Safety of frontline workers
Case finding	Supply of logistics	Cough etiquette	Relief measures for poor
Contact tracing	Training of health workers	Workplace strategies	Overcoming stigma
Information management	Involvement of other sectors	Chemoprophylaxis	Toll free helpline

Source

MOHFW. Summary of guidelines COVID-19. Ministry of Health and Family Welfare, Government of India

MOHFW. Resources. Ministry of Health and Family Welfare, Government of India. 2020 May 13. [Internet] [Cited 2020 May 13] Available from www.mohfw.gov.in

Public Health Measures in India

Any emergency health situation, like disaster or epidemic/pandemic, strikes suddenly and each country responds according to its preparedness. India responded to the pandemic by setting up a comprehensive response system at its borders much before WHO declared it as a Public Health Emergency of International Concern. Government of India, in coordination with and implemented by the states, issued guidelines for all measures required to combat the problem of COVID-19 that had already claimed thousands of lives in other countries.^{16,17}

Requisite public health and clinical measures were initiated well in time to contain the epidemic. (Table 3) To break the chain of transmission and prevent community transmission, the Government of India called for closure of educational institutions on March 13th 2020 and finally a nation-wide lockdown was imposed on March 24th 2020. The government also announced various advisories and awareness materials for the public, so that they can prevent acquiring or transmitting the disease.^{16,17}

Cluster containment strategy

India developed a scenario based approach for the following possible scenarios and has been implementing measures accordingly. The anticipated scenarios are:¹⁸

- i. Travel related case reported in India
- ii. Local transmission of COVID-19
- iii. Large outbreaks amenable to containment
- iv. Wide-spread community transmission of COVID-19 disease
- v. India becomes endemic for COVID-19

Currently, spread of coronavirus is not uniformly affecting throughout the country and many districts are experiencing large outbreaks. With this in view,

differential approach is adopted in different regions, with strong containment measures implemented in hot spots.¹⁸

Possible Setback

A pandemic can have grave impact on many fronts. It causes significant increase in morbidity and mortality, which are disproportionately higher in low and middle income countries. Pandemics can cause economic damage through halt in economic activities, expenditure on health services, provision of relief measures for the vulnerable population and loss of productive workforce. It also results in loss of education and jobs, as well as food insecurity. All these have subsequent long term impact on health.^{19,20}

During the recent Ebola outbreak of 2014-15 in West Africa, the health system was severely compromised due to deaths of healthcare workers, which resulted in closure of many health facilities and overwhelming demand on the functioning ones. Health system failures resulted in number of deaths caused by measles, malaria, HIV/AIDS and tuberculosis which far exceeded number of deaths from Ebola.^{20,21}

With the health system and life of citizens jeopardized due to present COVID-19 pandemic and efforts to contain it, setback in some aspects are likely to occur, as had happened during earlier pandemics.¹⁹⁻²¹ With overwhelmed health system, direct mortality from an outbreak and indirect mortality from other preventable and treatable conditions might increase to a large extent and thus the gains achieved by various programmes so far, might be compromised. Possible fall-outs expected in the health scenario may be experienced specifically in the context of vaccine preventable diseases, non-communicable diseases, mental health and also for all essential health services in general.

Vaccine preventable diseases (VPD)

Expanded programme on Immunization was initiated in 1978 in India, which has been able to increase immunization coverage of children 12-23 months of age from 35% in 1992-93 to 62% in 2015-16. To further speed up progress, an intensification campaign called Mission Indradhanush was launched and further intensified as Intensified Mission Indradhanush.²²

With onset of COVID-19, immunization services were disrupted both in terms of routine and intensified services in the initial phase of the disease, which might reverse the gains achieved so far. Ebola outbreak earlier had also seen substantial reductions in vaccination coverage.^{20,21} To prevent an increasing cohort of unimmunized children posing a risk of aggravation of VPDs, Government of India has considered continuing essential immunization services to protect children and pregnant women from VPDs, while fully observing social distancing, hand washing and respiratory hygiene during the immunization sessions.²³

Non-communicable diseases (NCD)

NCDs kill 41 million people each year, equivalent to 71% of all deaths globally.²⁴ Contribution of NCDs to the total disease burden in India, has increased from 30% in 1990 to 55% in 2016. There has also been an increase in proportion of deaths due to NCDs out of deaths due to all causes from 37% in 1990 to 61% in 2016.²⁵

Outbreaks of infectious diseases have long been associated with increased stress and automatic response in people's subconscious mind of a fear of infection, which is a normal reaction to prepare the individual for an acute response to possible harm by the flight or fight mechanism.²⁶ Stress has been reported to precipitate NCDs like diabetes, hypertension and stroke.²⁷⁻²⁹ With stress of current situation of COVID-19, fear of possible contraction of infection and subsequent death, and emotional turmoil due to restricted mobility as a result of lockdown, there is a possibility of rise in magnitude of morbidity and mortality associated with non-communicable diseases. On the other hand, these diseases pose greater risk for complications and further enhance fatality from COVID-19. In addition, inability to obtain medication by known NCD patients on treatment, due to disruption of services, can further aggravate the situation.

Mental health

A major epidemic brings about a psychosocial disturbance due to which the entire population remains in a state of mental stress. While most people are capable of handling this situation, some may manifest psychopathological condition which may even progress to delayed or long-term effects, depending on the magnitude of the event and degree of vulnerability of the individual. Prolonged suffering may lead to sadness, fear and anxiety. Commonly reported delayed effects are manifestations of post-traumatic stress, pathological grief, depression, substance abuse and psychosomatic disorders.^{26,30}

In the present stressful situation of COVID-19 with movement restriction and home confinement, mental health is likely to be affected. However, close proximity of family members may have a positive effect. Ministry of Health and Family Welfare has issued guidelines for combating stress and maintaining positive mental health.³¹

Essential health services

The Ebola epidemic had witnessed substantial reductions in access to and utilization of healthcare services.^{20,21} The WHO has released guidelines for countries to implement coordinated action to maintain essential health service delivery.³²

During this current situation in India, in spite of guidelines for essential health services to continue functioning are in place,³³ with transport services stopped due to lockdown accessibility to health services is a challenge for almost the entire population. As a result, seeking health care for emergency medical, obstetric and other conditions being difficult, adverse outcomes are likely to occur and institutional delivery rate might also come down. Efforts need to be scaled up to prevent this occurrence.

The Way Forward

Even though the present pandemic is playing havoc, future is not so dismal if lessons are learned from this and utilised for future benefit. A lot of gains are likely to be achieved if current strategies are continued beyond this phase of pandemic. Through concerted efforts, the country can bring positive change by strengthening the systems support of both public and private sector, as well as by improving health behaviour of the

population. The present situation can be utilized as an opportunity to our benefit and carry forward the currently implemented efforts, to bring about tangible gains in the field of public health.

For the Country

1. Due to restriction in mobility and physical interaction, the country has seen increased use of technology for conducting tele-meetings, providing tele-health, conducting webinars and continuing academic activities through online classes in virtual classrooms. Continued use of technology will improve output, quality and efficiency of administrative, health and all other activities, along with increase in accessibility to services.
2. The present Government of India has encouraged entrepreneurs to use their skills and systems for contributing to productivity of the country through Make-In-India project. Gearing up this project will enhance self-reliance of the country and boost economy.
3. Industries, non-governmental organisations and community have put in tremendous efforts in designing and production of essential items like personal protective equipment, sanitizer, ventilator etc. This initiative can be utilised in future for other equipment also, which will make the country self-reliant on locally made products.
4. Combined and coordinated efforts of central and state governments, administration, health system, support system and cooperation of the entire community having taken this up as a people's programmes being exhibited during the current situation, will ensure better functioning of all programmes, leading to improved health, economy and social status of the country.

For the health system

1. Sudden increased demand for health services has resulted in up-gradation and strengthening of health facilities by increasing beds in wards, ventilators and other life-saving equipment in intensive care units, adequate good quality personal protective equipment, comprehensive operational guidelines for every service and extensive training of all categories of healthcare personnel. This will help in better patient management of health services in the post-COVID phase also.
2. Operational guidelines have been made for infection prevention and control practices

at health facilities. Stringent and continuous implementation of these measures will result in reduction of iatrogenic and nosocomial infections in both patients and health care providers.

3. A well-development surveillance system, the Integrated Disease Surveillance Programme, was already established and functioning in the country. Gearing up the current surveillance efforts and continuing the same in the future, will lead to early detection of any disease or health-related condition and initiation of measures for its containment well in advance.
4. A pandemic of such extensive scale has enhanced the preparedness of the health system to handle such situations and made a blueprint for action that can be followed to combat any endemic or epidemic condition that might occur in future.

For the beneficiary

1. Implementation of extensive IEC measures to the community has resulted in increased awareness among all citizens, including those in lower rungs of the socio-economic hierarchy. Such continued efforts will lead to adopting better life style and improved health seeking behaviour by the entire population.
2. Public health and preventive practices like proper hand washing with soap and water, compulsory wearing of masks, avoiding spitting in public places, maintaining sanitary practices within home and after returning from outside, is expected to reduce gastrointestinal, eye and skin infections, respiratory infections and chronic respiratory conditions due to air pollution, to a considerable extent.
3. Limiting outdoor activity and travel, and spending more quality time with family may increase social bonding and improve mental health of all groups of population, more so in elderly family members.

For the environment

1. During the lockdown phase, major section of workforce providing non-essential services were prohibited to travel to office and were thus working from home. Employers can be encouraged to allow their employees to continue this practice as much as possible, even after the epidemic situation is controlled in the country. This will reduce consumption of

resources in the office and also prevent loss of time due to commuting by employees, which will result in increased and efficient output.

2. Industrial and construction activities have also been put on hold during the lockdown phase. Though complete closure of such activities is not possible limitation of such activities along with reduced work-related and recreational travel, will improve quality of air.
3. Reduction of injudicious human activity has already made the air visibly clear and nature has started healing. All such measures need to be continued in the future to the maximum possible extent with joint and coordinated efforts from the government, industries and the citizens. This will go a long way in restoring the ecological balance among flora and fauna, thereby combating the severe environmental degradation that all countries of the world is suffering currently with all its threatening consequences. This by itself might put on hold widespread occurrence of communicable and non-communicable diseases, thus improving health of the entire population.

Conclusion

While some setbacks are imminent and unavoidable, the present pandemic can also be considered as an opportunity to make positive changes in the field of public health by improving the system and people's behaviour that will help to bring about better functioning of the system in all aspects and improve health by adopting better life style. Lessons learned from present situation will also increase preparedness for combating similar crisis that might repeat in future. Most importantly, the policies adopted for combating the current pandemic holds promise to reverse the environmental degradation that has been rapidly progressing with its toll on all flora and fauna of the earth including human population.

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