Review Article

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India and COVID-19: the task ahead

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ABSTRACT

COVID-19 pandemic has impacted countries across the globe causing unprecedented morbidity and mortality and weakening the economic fiber of each country. India too has to face this challenge by its strengths and manage the weaknesses to get over this COVID-19 disease, which is recording an average of 30 to 40000 positive cases per day in july2020. The factors in favor of India are the epidemiological parameters such as low case fatality rate of 2.43%, recovery rate of 66%, the young population (67% between 15 to 64 years), and only 7% (65 years plus) population. The guidelines issued by government of India regarding ban on travel, quarantine, isolation, treatment protocols, containment zones and testing policies steering the country with low death rates. The supreme court directive to increase testing facilities is being implemented with all medical colleges and private sector given permission for testing. The "point of care test" at hot spots will unearth asymptomatic and pre-symptomatic cases and prevent transmission from them. However, lack of concept of insurance and prevention in the community, misconceptions about quarantine, economic crisis and insufficient health infrastructure are hindrances in managing the current pandemic. The dictum of prevent, test, track and treat given by Indian council of medical research chief is the path to be followed. Aided by the various digital apps for contact tracing, tele medicine for managing cases in remote areas and provision of hospital facilities for moderate and severe cases till the indigenous vaccine arrives, should be the strategy adopted by India to get over the COVID-19 pandemic.

Keywords: COVID-19, Case fatality rate, Recovery rate, Reverse transcription polymerase chain reaction, Pandemic, Quarantine

INTRODUCTION

COVID-19 has impacted countries across the globe causing unprecedented morbidity and mortality and weakening the economic fiber. Each country is struggling to manage the situation to the best of their ability guided by knowledge from the scientific community.

India is facing the onslaught of the COVID-19 since the first case was observed in Kerala on 30 January 2020, now the cases are nearly 15 lakhs with 4.85 lakh active cases with 34.2 thousand deaths and 98.75 lakhs positive

cases have recovered.¹ None of the mathematical models made on Indian data have been able to predict correctly the progress of the disease in India. In the absence of definitive pathways the government acted on the advice of the experts and the Ministry of Health & Family Welfare.² The implementation of the "lockdown" from 24 March till end May 2020 had kept the occurrence of many positive cases at bay, but ever since the "lockdown" has been lifted and activities resumed including opening of offices, business and travel, the cases are increasing exponentially and no one knows when the rising graph will plateau and reverse. The breather allowed by

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"Lockdown" to authorities has enabled the central and the state governments to make arrangements in the health care sector to manage future increase in cases. The observance of wearing masks, physical distancing and hand sanitization are the preventive actions of individuals which are the key to prevent infection with COVID-19. These steps however have not solved all the problems as have happened due to COVID-19, and India has to confront the challenge with its strengths and weaknesses.

THE WINDOW OF HOPE FOR INDIA EXISTS IN THE FOLLOWING WAYS

The epidemiological parameters

Recovery Rate though India stands third after USA and Brazil in cumulative number of positive cases, comparatively the number of deaths and the recovery are much better. The case fatality rate in India (3%) is about half of what is present globally (6%).³ Among all the chaotic situation prevailing in the country and the daily spike in the number of cases, a ray of light is the improving recovery rate which stands at 66% currently which can be seen in (Figure 1).⁴ Other parameters which

are favorable for India is the case fatality rate (CFR) which has dropped to 2.43% from 3.36% as compared to the global figures.⁴ The number of cases per lakh population in India are also lowest in the world, with 20.77 cases as compared to 91.67 cases globally.⁵ The (Figure 1) shows variations in recovery rate in past few months occurring in India. It can be seen that the recovery rate has been improving gradually with passing months.

If the elderly or those with comorbidity, who are most likely to develop complications if infected, can escape getting infected till a vaccine becomes available, India can get over this pandemic with less mortality. Innate immunity present in the Indian population due to exposure to multiple viral diseases, large scale bacille Calmette-Guerin (BCG) vaccination and use of chloroquine in malaria endemic areas are contributing to low case fatality rates. The cooking practices which include certain spices also help to boost immunity amongst the population. Added to this, the young age structure of the population (67% is from 15 to 64years-2019) are factors favouring India in the fight with COVID-19.the 65 years plus persons are only 6.38%. As compared to 16% of USA and 22.75 % of Italy.

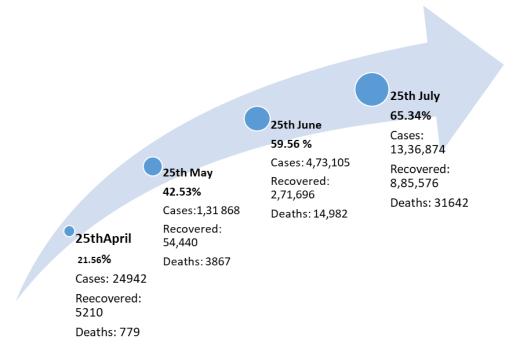


Figure 1: The recovery rate increasing month wise in India.⁴

Regulatory measures

The Indian council of medical research (ICMR), Ministry of health and family welfare (MOH&FW) and the Home ministry, government of India issued regulatory guidelines since the start of the COVID-19 epidemic in India, as and when new knowledge was added, regarding control of COVID-19. Post "Lockdown" graded release of restrictions, but with continued closure of places for mass gatherings like University, schools, colleges, malls,

hotels and cinema halls are exerting some control over the COVID-19 numbers which would have exploded otherwise. The selective contact tracing and quarantine of all domestic travelers are steps enforced in an effort to contain the spread. The recent guide lines on home isolation for mild symptomatic COVID-19 positive patients are aimed at reducing the burden on COVID-19 related healthcare infrastructure, that is severely strained in certain states, and specifically in the big metropolitan cities.⁹

Testing for COVID-19

Effort is on to increase the number of tests being done from the current rate of 140 per million. MOHFW and ICMR both have asked the states to frame strategies to increase the number of tests per million by involving all government and private medical colleges for testing using RT-PCR machines together with the existing ones including the private laboratories. A "point of care test" has also been permitted by ICMR for rapid identification of infected individuals in "Hot spots". 10 The supreme court directives for improving access to testing have given the much-needed boost to tackle the situation and augment testing. So, to enable easy access to testing for COVID-19, ICMR has advised to put a cap on Reverse transcription polymerase chain reaction (RT-PCR) test charges at private hospitals & diagnostic centres. This has helped to reduce the work load on the government testing centres and also facilitated prompt results for clients, who otherwise had to wait for days to get the report.¹⁰

Vaccines

The arrival of indigenous vaccines has raised hopes of mitigating the situation in face of the tremendous rise in the number of cases across the country. The approval for human trials by two made-in-India COVID-19 vaccines, marks the 'beginning of the end,' according to the authorities in the government. Two COVID-19 vaccine candidates- covaxin, was developed by the Hyderabad-based bharat biotech international limited in collaboration with the ICMR and the national institute of virology (NIV) and ZyCov-D vaccine by zydus cadila had recently got the nod for human clinical trials from the drug controller general of India. Both have been approved for Phase II, III trials. ¹¹

Digital tools

The arogya Setu app is playing a significant role in tracking of COVID-19 patients and is also a source of reassurance that positive cases are not nearby to cause infection. There are many more apps available in the market which the community can use. However, uniformity and validity of the information obtained needs to be ensured. In a study of the various apps available in India currently to manage COVID-19 dissemination of COVID-19-related information untargeted preventative strategies and for monitoring the movements of quarantined individuals including self-testing of symptoms. It was noted that monitoring quarantine was the function of 27 (54%) and 19 (32%) apps focused on self-testing. Eight (16%) apps had a contact tracing and hotspot identification and monitoring function.¹² Another app though not related to COVID-19 directly is tracking the migrants in UP. Developed by united nations development programme (UNDP) the app named 'Pravasi Rahat Mitra' is not only tracking the migrants but also creating a data base of their skills and feeding information to them about possible jobs. As India has the skilled workforce in IT India's response to COVID-19 can be strengthened by developing more comprehensive mHealth solutions for frontline healthcare workers, the rapid response teams and to communicate with the community.

THE CHALLENGES FACED BY INDIA

India has been severely damaged by the impact of COVID-19 but the most affected states consistently include Maharashtra, Delhi, Tamil Nadu and lately Karnataka & Andhra Pradesh too (Figure 2).² Be it the dense population, lack of significance of preventive measures, poor administrative actions and unequipped hospital facilities have all added to the increase in the number of cases. Maharashtra recorded the maximum number of deaths nearly 44% of all India deaths followed by Delhi.¹³ These are the states to be affected from the initial stages, both having large slum areas where overwhelming number of cases led to numerous deaths. However even with the withdrawal of all India "lockdown" these states are following containment measures in hotspots to control the spread. Partial "lockdown" is still being followed by Maharashtra as the cases have not decreased. Improvement in hospital facilities at both states has reduced deaths.

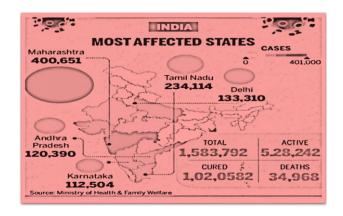


Figure 2: The number of cases in the worst affected states.²

Lack of concept of prevention and insurance

Out of pocket expenditure (OOPE) out of total health expenses has been high in India 62.40% as reported by world bank for year 2017. But this has not changed the attitude towards health insurance. In the surveyed population nearly 50 % of the households belong to lowest or second lowest wealth index and amongst them only 65% are covered by rastriya swasthya bima yojna. In this has currently increased to 73 per cent of eligible households covered by health insurance, either through pradhan mantri jan arogya yojana (PMJAY) or state schemes. However medical expenses are likely to rise in case infection occurs due to COVID-19 and hospitalization is required. Unfortunately, many of the needy households are not aware of these schemes.

In the background of this and the country being under a complete lockdown for nearly 3 months, during the "Lockdown" period, millions of migrant workers who got stranded in towns and cities, far away from home, with no jobs or money even to feed themselves, started for their native villages. In their effort to reach home they collected in thousands at bus and railway terminals or got huddled in trucks to be at home. The guidelines regarding using mask and social distancing got lost in the process. May be, many did not understand the dangerous implications of not following the advice of social distancing. The national Family Health Survey (NFHS) Survey 4 has pointed out that only 6 to 10 % women in urban and rural areas have been given any health education by the ASHA. These migrants primarily from the states of UP, Bihar, West Bengal may be oblivious of the fact that they are getting infected with COVID-19 en route and carrying it to their residences. The situation is worse in the metropolitan cities with expansive urban slums having high density of population living neck to distancing Advising social under circumstances is infructuous. Managing two meals a day is more important for those belonging to the lowest or second lowest wealth index (NFHS 4) than worrying about COVID-19 infection which is a matter of concern for future. The relaxation of the various restrictions imposed earlier, such as the opening of offices and business, markets, shops and restaurants etc with availability of inter-state trains, buses and domestic flights, gave the community reason for rushing out of their houses for some freedom, to earning a living, for completing pending work and the stranded ones to return to their destination. But with livelihood gone, social distancing and frequent washing of hands are statements to be heard but not to be followed till the masses are able to make a reasonable living. Coupled with dingy houses, common toilets, water scarcity and occupational demands, observed in high density areas in Mumbai and Delhi has made handwashing with soap &water, which is essential to prevent infection with COVID-19, difficult to practice. Even otherwise use of soap is not common as was revealed by the 6th round of the national sample survey organization (NSSO) findings that only 36 per cent Indian households wash their hands with soap before a meal and over 74 per cent wash their hands after defecation.¹⁷ In such a situation the general public is left with only mask to protect themselves . A big challenge exists to make the common man adopt the safety guidelines for prevention.

Misconceptions about quarantine

"Quarantine" refers to separation of individuals who are not yet ill but have been exposed to COVID-19 and therefore have a potential to become ill. "Isolation" refers to separation of individuals who are ill, suspected, or confirmed COVID-19 cases. People have not understood the significance of these two measures for stopping the spread of Covid -19 and are afraid to support such actions by the enforcing authorities including instructions of the

health care personnel. Families of COVID-19 positive persons have attacked the health care teams reaching homes of positive individuals for contact tracing and implementing the quarantine measure stacked the health care teams reaching hoes of positive individuals for contact tracing and implementing the quarantine measures. Isolation by itself is an agonizing situation and asking communities to adopt it, is unlikely to be easily acceptable, unless they accept the seriousness of how their inaction will result into a calamity for others around them. Public health interventions are topdown in India and are imposed without ensuring that the 50 % population of lowest and the second lowest wealth index have understood and accepted it. Other important factors include fear of isolation and stigma attached to those who being quarantined and isolated The routine Information, Education & Communication activities which are the mainstay for informing community regarding the health programmes is infructuous as indicated by the example that even after a lapse of forty five years, since the start of the HIV epidemic, only 21% amongst women and 33% men in the age group 15 to 45 years have comprehensive knowledge about HIV/AIDS a non-curable disease. 18

Economic crisis

The whole world is reeling under the global slump brought about by the COVID-19 pandemic. In India the continued "Lockdown" for three months made production and businesses come to a standstill as a result of the closure of factories. flights, travel. business establishments, religious and social events and so on. The "Lockdown" while averting the transmission of COVID-19, has dealt a heavy blow to the financial condition of the country, as a consequence many have lost their jobs in organized and unorganized sector, leading to an economic downfall and pushing more people below the poverty line. According to NITI Aayog, India needs 6.2% additional spending of GDP to achieve 2030 development goals.¹⁹ But achieving the SDGs targets for India has become difficult under such circumstances calculation is that COVID-19 sharply slashed the projection for India's GDP growth in calendar year 2020 from 5.3% to 2.5%. ²⁰ Graded lifting of restrictions started from first week of June 20 to stop further deterioration in the economy of the country. This has provided plenty of opportunities for people to get together which in turn is causing huge spikes in the number of positive cases at and the highly affected (Figure 2). Eventually India may escape a recession, but coronavirus has slowed down growth and the situation will take a long time to get back to new normal.

Impact on mental health

The lockdown and the subsequent monetary losses have impacted the "Mental Health" of the community across the globe and India is no exception. The magnitude of the problem prompted WHO to come out with a publication for health care personnel, to tackle mental health in the community.²¹

In India a survey conducted by the Indian Psychiatry Society, within a week of the start of the lockdown, observed that the number of reported cases of mental illnesses in India had risen by 20%.22 While the depressing affect is being felt by all, it has disproportionately impacted the poor, and marginalized groups who are fighting joblessness, poverty and fear of COVID-19. The national institute of health and neuro-sciences mental (NIMHANS) Bangalore, has been studying the process in India, and has come out with guidelines which include Tele psychotherapy services and for Tele psychiatric Social Work.23

Health infrastructure

India's healthcare infrastructure is struggling hard to deal with this crisis today and the health system in some, like the states of Maharashtra & Delhi are overloaded. Shortages in medical supplies, protective personnel equipments (PPEs), adequate testing facilities and beds are the major issues. There is a major shortage in the availability of beds in the hospitals and the glaring example is of Mumbai where the health care is cracking under the weight of the large number of cases. It has been observed that in recent years, India increased its bed capacity from 0.7 beds per thousand, in 2011, to 1.13 today. But still it is insufficient to deal with this crisis. The bed capacity in states of Bihar (0.1), Madhya Pradesh (0.4), Rajasthan (0.6) and Uttar Pradesh (0.3), where one in every four persons is below the poverty line, and paying capacity is less than the national average is home to more than half of India's population.²⁴ It is estimated that about 5-10% of total patients will require critical care in form of ventilator support. No confirmed official figures are documented on the number of ventilators available in the public sector. A rough estimate obtained by using the number of hospital beds available in government sector 7,13,986: out of which 5-8% are ICU beds (35,699 to 57,119 ICU beds).²⁵ Ironically, in this time of crisis, it is the government hospitals which are taking on the major burden of cases. India has just 0.8 doctors per 1000 population as against Italy's 4.1, China's 1.8, Spain's 4.1, Iran's 1.1 and the USA's 2.6 and just 0.7 hospital beds per 1000 population against Italy's 3.4. Spain's 3. Iran's 1.5 and the USA's 2.9.26 India has dealt well till now with this limited infrastructure and preparing to face the problems of the current tsunami of cases. However model based estimates for India and state wise, in terms of number of hospital beds, Intensive Care Unit (ICU) beds, and ventilators, affirm, that existing bed capacity is mostly saturated at government hospitals and providing accommodation for rapidly rising number of COVID-19 patients, require immediate expansion of current capacity or modifications in admission policy for routine patient care taking a cue from this prediction the government guidelines have been issued for cluster containment and hospital admission for only moderately and severely ill patients. ^{27,28}

The big break in basic healthcare

The Lockdown in the country reduced COVID-19 transmission but affected the routine preventive and curative services. The chief amongst them are the routine immunization program and other diseases which require regular medication and follow up. Hundreds and thousands of children might already have missed their scheduled vaccinations and thousands of adults may have missed potentially life-saving medical treatment because of restrictions on movement due to COVID-19 virus. The other suppressed services include, restricted inpatient, outpatient and emergency treatment for infectious and diseases, reduced non-communicable laboratory investigations, and lowered access to mental health treatment.²⁹ Many health workers are also unavailable because of redeployment to COVID-19 response duties. A range of hundreds of indicators show a worrying disruption in India's basic health services as local administrations focused on containing the spread of COVID-19. The disruption in the services has affected the persons suffering from chronic diseases most worldwide, as has been reported by WHO. In majority (94%) of the countries, the health staff working in the area of non-communicable disease (NCDs) were partially or fully reassigned to support COVID-19 duties. However, among the countries reporting service disruptions, globally,58% of countries are now using telemedicine (advice by telephone or online means) to replace in-person consultations. In low-income countries this figure is 42%.30

Prevention

The community is aware about the preventive methods but that has not changed the attitude of many especially young persons about non-use of mask and no social distancing. Creating "Community Action Groups" for awareness generation regarding the impact of risk behavior of individuals and on those around them, needs to be taken up on war footing. By implementing behavior change communication (BCC) strategies can be evidencebased communication programs suited to the local area. Focused intervention is needed for the urban slums and the rural areas. Radio is a better media for communication amongst this group than WhatsApp for spreading safety related messages. Youth volunteers from Nehru Yuwak Kendra for rural areas and the University/college students under National Service Scheme for urban population, may be trained, to conduct the BCC. The emphasis should be on the importance of hand washing, wearing mask and maintaining social distancing with respect to COVID-19 when out of house. Not only these, information about the virus, the signs & symptoms, treatment, use of pulse oximeter, significance of cooperating for testing, isolation & quarantine and whom to contact for testing, will allay the fears about COVID-19 and the stigma attached to

positive persons. Community participation is the key for successful intervention.

Test

The testing should be increased by RT-PCR and Rapid antibody Tests at "Hot Spots" no eligible suspect should be left untested for COVID-19 as per ICMR guidelines for rapid antibody tests in hot spot areas. The latest guidelines by ICMR permitting point of care molecular diagnostic assays,(Standard Q COVID-19 Ag detection kit) which is easy simple and gives result in 15 minutes can be applied in field settings Besides testing of symptomatic cases and their contacts, targeted random screening of frontline workers like doctors, nurses, paramedical workers, security guards and police personnel should be done on a regular basis. As the asymptomatics and the pre-symptomatics are the main source of infection, random screening with point of care tests in the urban slums, crowded places, markets, offices, old age homes, shelter homes or other vulnerable population or places, should be taken up. Weekly surveillance testing, paired with case isolation, would limit an outbreak even if the testing method was less sensitive than PCR, compared to surveillance testing done every 14 days by PCR, which would allow the total number of infections to climb almost as high as if there were no testing.³¹

Reporting of results of all cases tested in public and private sector is essential for drawing scientific valid conclusions regarding the status of infection in the population.

Track

As per ICMR guidelines cluster testing and contact tracing is already underway and places /houses with positive cases are made Containment Zones for appropriate action to prevent spread of disease. This is one area where the Arogya setu app and other apps can play a role. More secure digital tools or health solutions can be the mainstay for informing, guiding and tracking individuals at risk to access the health services at the appropriate time and prevent spread of disease. Partnering with all ministries for tracing and containing the contacts is the need of the hour.

Treat

The treatment is not only for COVID-19 cases in hospitals but also for the mental illnesses precipitated as a result of COVID-19. ICMR is issuing guidelines from time to time of treatment protocols as per new research findings and all the drugs are available for the treatment of the patients. The status of Telemedicine in India may not be robust, but is being implemented by many agencies and by government of India as apart of digital health policy Government of india.³²

Time bound improvement in health infrastructure and Tele-ICU solution would enable hospitals using electronic medical records (EMR), to have patient data remotely monitored via real-time audio-visual tools, internet connected sensors and alerts, as has been done at Gulbarga Institute of Medical Sciences, Karnataka. This will provide the remote patients treatment from qualified doctors and make available the saved beds for other needy patients.³³ In low-resource settings where oxygen supplies and monitored beds are scarce, a triage tool developed in collaboration with WHO uses pulse oximetry to guide management of oxygen therapy. Early recognition of hypoxia and oxygen administration has been shown to reduce mortality. Pulse oximetry in lowresource settings during the COVID-19 pandemic.³⁴ So positive cases who are asymptomatic or pre-symptomatic during testing can be demonstrated use of pulse oximeter to know their oxygen status and rush to hospital if there is a drop in the SPO2, even if the person does not feel unwell.

COVID-19 is here to stay according to WHO, and framing cost effective scientifically sound strategies, will prove beneficial to handle the COVID-19 pandemic in the long run.

CONCLUSION

COVID-19 has posed a challenge which the country has handled with scientific evidence so far. Over time knowledge has emerged about the modes of transmission, reproductive rate, signs & symptoms and treatment guidelines to manage the current situation. Based on this information regulatory guidelines were issued to contain the spread of COVID-19. However unknown parameters still exist such as the number and profile of the asymptomatics which has hindered appropriate modelling and forcasting for the disease. Hence to continue to manage the uncertainity with minimum damage, the recommendations are proposed.

Recommendations

In the face of the continuing threat of COVID-19 transmission which is still to reach the peak in India, we should readily adopt what the ICMR Director has stated that is in such a scenario India should focus on the basics of epidemic prevention, test, track and treat. These are the four steps which India needs to reinforce. Above all as an individual we should not forget that there is a need to bring the change within ourselves as an individual before we point out to the world and the least, we can do is wear masks, sanitize /washing hands and maintaining physical distancing.

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