



THE IMPACT OF COVID-19 PANDEMIC: A LITERATURE REVIEW

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ABSTRACT:

Novel Corona Virus Disease (COVID-19) originating from China (Wuhan) has rapidly crossed all the borders of most countries and has started infecting people throughout the whole world. This phenomenon has led to a massive threat to public health; the media has been taking efforts continuously across all the borders to keep all of us informed and updated about the impact of this pandemic situation. All these things are creating a lot of concern for people leading to heightened levels of anxiety and anxiety is a common response to any stressful situation. So Covid-19 is a threat to an Indian as well as International peace; to avoid its long term ill effects medical fraternity must educate public and policy makers too about it. The need of the hour is to develop a solid defense mechanism with national-international collaboration.

Index terms: Covid-19, Disaster, Novel Corona virus, SARS Co-V2

Introduction:

According to WHO (1998), “health literacy represents the cognitive and social skills which determine the motivation and ability of individuals to gain access to, understand and use information in ways which promote and maintain good health”.¹ COVID-19 started as a viral outbreak in December 2019, in Wuhan city of China. A cluster of about 40 cases of pneumonia reported with the unknown etiology, some of the patients being vendors and dealers in the Seafood market there. World Health Organization (WHO) along with Chinese authorities started working together on the same and the etiological agent was soon be established a new virus and named Novel Corona Virus (2019-nCoV). Meanwhile, on 11th January China announced its first COVID-19 related death of a 61-year-old man, exposed to the seafood market.² Within no time the virus crossed all the borders of more than 120 countries³ and started affecting all over the world; which created a major impact and threat to the public health. Coronaviruses (CoV), having a total of 39 species under the broad realm of Riboviria⁴ belongs to Coronaviridae family of order Nidovirale. CoV are single-stranded RNA viruses (+ssRNA) having a spike glycoprotein on the envelope.⁵ Coronaviruses, so named due to the outer fringe of envelope proteins resembling crown ('corona' in Latin). This virus is further subdivided into four genera; alpha, beta, gamma and delta.⁶ They are generally pathogenic to mammals and birds and cause mild upper respiratory tract infections in humans.² Increase in Covid-19 cases has also caused economic issues all over. Although the virus appears to be less pathogenic than MERS-CoV and SARS-CoV, it shows a better efficacy of human-to-human transmission.⁷⁻⁹

Aim of the review: This review aims to compile currently available data about COVID-19 infection and its impact. The review is updated till the time of writing; however, the data is evolving, and the conclusions made here might change later.

Methods^{10,11}: A thorough literature search was performed to understand and identify the updates in the field of Covid-19. We searched PubMed database, Google Scholar using the key terms ‘COVID-19’, ‘SARS-CoV-2’, ‘Novel Corona Virus’ up to April, 2020.

Inclusion criteria: Original research articles, Systematic reviews, meta-analysis and narrative reviews especially emphasizing on Covid-19. Articles reported only in English were considered for the present review.

Exclusion criteria- Articles whose only abstracts are readable, original research articles with weak methodology, articles reported other than English language.

Source of literature: Contact with Experts, Electronic database PubMed, Google, Wiley online library, PMC and Manual Search were done till 2020 for the relevant literature using key phrase “Covid-19”.

Selection of articles: After search of databases and removal of duplicates, three authors independently screened the titles/abstracts using the selection criteria. For relevant articles, full texts were obtained for further evaluation. In case of any discrepancy subject experts were consulted and the issue was resolved.

Information obtained: Literatures, Reports, Questionnaire, and Guidelines

GLOBAL SCENARIO:

India's first case was confirmed on 30 January 2020. Italy and Spain had their first cases confirmed a day later. The USA had its first case confirmed on 20 January. By April 7, 2020, more than one million (1,383,436) persons have been globally infected due to the convergence of this uncontrollable infectious disease. Most of the global population has been depressed and threatened due to the exponential growth of infection and the increasing number of fatalities.¹² The confirmed cases of SARS-CoV-2 infections, have reported illnesses ranging from mild to severe illness, sometimes leading to multiple organ failure. Present estimate for the incubation period ranges between 2 to 14 days after exposure to the virus. Symptoms include fever, cough, shortness of breath, sore throat, headache, fatigue, myalgia etc.¹³ Compromised lungs condition due to the significant infiltration in some cases may lead to multiple organ failure. A brief report from Wuhan Municipal Health committee has said that viral pneumonia is related to the virulence of the virus, the route of infection, age and immune status of the host.¹⁴ The primary route for spread of COVID-19 is thought to be by droplet transmission, during coughing and sneezing as well as contact with fomites.^{15,16} However there are legitimate concerns regarding aerosol transmission generated even during talking and breathing. Faeco-oral

transmission has also been reported in a few cases, with viral isolation from the faeces of some patients.^{17,18} The type of specimen that can be collected from patients under investigation for SARS-CoV-2 include: lower respiratory (bronchoalveolar lavage, tracheal aspirate and sputum), upper respiratory (nasopharyngeal swab and oropharyngeal swab, nasopharyngeal wash/aspirate or nasal aspirate) and serum specimens.

INDIAN SCENARIO:

India is facing various major challenges on the COVID-19 front. It has a huge population: 1380million (USA 330million, Iran 83million, Italy 60million, Spain 46million). It is densely populated country: 464 people/km² compared with Italy's 206, Spain's 91, Iran's 52 and the USA's 36.¹⁹ Cities such as Delhi, Mumbai, Kolkata, Chennai, Bangalore, Hyderabad and Pune harbor millions of people who depend on public transport. The latest data from the government National sample survey organization say that only 36% of Indians wash their hands with soap before a meal.²⁰ Even more distressingly, 160million Indians do not have access to clean water to wash their hands.²¹ 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 2.6.7 India has just 0.7 hospital beds per 1000 population as against Italy's 3.4, Spain's 3, Iran's 1.5 and the USA's 2.9. The current growth rate of the epidemic in India was calculated to be 1.15.3 It means the number of new cases increases by approximately 15% every day.²²

Before the 21-day lockdown imposed from 25 March, mathematical modeling put the number of expected cases in India between 300million and 500million by July end, with a peak somewhere in April and/or May of 100million cases, with 10million (10%) requiring hospitalization, 5million recovering, 5million needing critical care and 1 to 2.5million deaths. After the lockdown, these numbers are estimated to come down by about 80%, with 1million needing critical care, including ventilator support.²³ India has just 20000 ventilators. That is a 98% shortfall. The government response has been to make 40000 more by June. After almost 2 months, India has had only 20 COVID-19 confirmed deaths as against 9000 in Italy, 5000 in Spain and 1200 in the USA.¹⁹ Ghosal S conducted a linear regression analysis in March 2020 to predict the number of deaths in India, and concluded that if situation continue in present state projected death rate is 211 and 467 at the end of 5th and 6th week from now respectively.²⁴

There are only few detection centers to screen Covid-19 so the cold chain is necessary to transport samples such as sputum, blood, urine, and nasal swabs from collection points to testing centers. Close monitoring to better understand the epidemiology and transmission pattern across all states is vital. The government needs to observe the effectiveness of public health policies in terms of social implication on the ground.²⁵ As per the stochastic mathematical model by Chatterjee K, at current growth rate of 1.15, India is likely to reach approximately 3 million cases by 25 May, implying 125,455 ($\pm 18,034$) hospitalizations, 26,130 (± 3298) ICU admissions, and 13,447 (± 1819) deaths. This would overwhelm India's healthcare system. The model shows that with immediate institution of NPIs, the epidemic might still be checked by mid-April 2020. It would then result in 241,974 ($\pm 33,735$) total infections, 10,214 (± 1649) hospitalizations, 2121 (± 334) ICU admissions, and 1081 (± 169) deaths.²² Although the virus is very infectious/contagious and spreading globally, it is too early to comment on its virulence in India. Community transmission has not yet been reported in India at the time of publication of the present review. Follow-up of diseased cases, its spread and clinical presentation of cases in the larger population will give a better insight to the COVID-19 outbreak in India. It is important that each health care facility records all the data of screening, triage, management, etc. in a structured manner. The availability of information technology experts in the country may be useful in developing these.²⁶

India has just launched Aarogya Setu app, which is a first-of-its-kind participatory disease surveillance initiative in India. This will supplement the existing Integrated Disease Surveillance Program in India by finding missing cases and having faster aggregation, analysis of data, and prompt response measures. This newly created platform empowers communities with the right information and guidance, enabling protection from infection and reducing unnecessary contact with the overburdened health care system.²⁷

Effect on Daily Life^{28,29}-This outbreak has affected each one of us some or the other ways. To avoid the mass spreading of this pandemic, nationwide decision on complete lockdown was taken by the Prime Minister, India. However, this lockdown is also creating chaos and huge difficulties for the people.

Economic Effect: a. Decrease rate of manufacturing process of essential goods/things.

- b. Disrupt the supply chain of products.
- c. Financial losses in National and International businesses.
- d. Decreased cash flow in the market.
- e. Decreased revenue growth

Healthcare: Scarcity of healthcare resources is already a major challenge.

- a. Difficulty in tracing, diagnosis, quarantine, treatment and prevention of suspected/confirmed cases.
- b. High burden on health system
- c. Because of this high burden patients suffering from other diseases may get neglected.
- d. Doctors and other healthcare professionals are at high risk.
- e. Overload on medical shops
- f. Requirement of high protection
- g. Disruption of medical supply chain

Social effect: a. Service sector is not being able to provide their proper service

- b. Cancellation or postponement of large-scale sports, tournaments, meetings and gatherings.
- c. Avoiding the national and international tours
- d. Cancellation/postponement of celebration of cultural, religious and festive events.
- e. Undue stress among the population affecting mental health
- f. Social distancing with our peers and family members
- g. Closure of the hotels, restaurants and religious places

h. Closure of places for entertainment such as movie and play theatres, sports clubs, gymnasiums, swimming pools, and so on.

i. Postponement of examinations

As school, colleges, institutes, universities are closed, in fact there is cancellation or postponement exams are affecting academics of the students. In this situation, faculty members should engage the students academically through online for the benefit of their academics and career eventually. The faculty members should also engage themselves actively in upgrading their own knowledge, writing research papers, attending webinars etc. This will gain their and confidence of their students. Also, students will be in phase with the academic calendar. This constant student engagement activity will strengthen the Teaching-Learning and it is sure that it will break the chain of spreading of COVID 2019.³⁰

Diagnosis: Early diagnosis/screening is important for appropriate treatment. Screening for Covid-19 includes three different methods such as (1) Epidemiologic screening for travel and potential exposures, (2) History for symptoms suggestive of Covid-19, and (3) Laboratory screening like nasopharyngeal and oropharyngeal or Broncho alveolar lavage sample for testing Covid-19.³¹

To detect this novel coronavirus, molecular-based approaches are the first line of methods to confirm suspected cases. Nucleic acid testing is the main technique for laboratory diagnosis. Other methods such as virus antigen or serological antibody testing are also useful assays with a short time being for the detection of novel coronavirus. As with other emerging viruses, the development of methods to detect antibodies and viral antigens are started after the identification of the viral genome.³²

Treatment:

A survey conducted by Gupta L *et al* provides the viewpoint of a large number of rheumatologists that Hydroxychloroquine (HCQ) was preferred for treatment of covid-19 (81.9%) followed by other drugs and could shape future evidence-based opinions on managing patients with Immunosuppressant during the covid-

19 pandemic.³³ Kaur H reported that HCQ seems to be promising in terms of less number of cases with radiological progression with a comparable safety profile to control/conventional treatment and need more data to come to a definite conclusion.³⁴ Teixeira da Silva JA reported that as the number of infections increases, the convalescent plasma of infected patients could be donated or harvested for simultaneous treatment or future use until an effective antibody is discovered.³⁵ In a recent study, it was shown that chloroquine efficiently inhibits the COVID-19 viral infection. As chloroquine is cheap and safe drug and is being used for last 70 years, it can be clinically used against COVID-19.^{36,37} However Singh AK concluded that considering minimal risk upon use, a long experience of use in other diseases, cost effectiveness and easy availability across India, they propose that these drugs are worthy of fast track clinical trial for treatment, and may be carefully considered for clinical use as experimental drugs. Since HCQ has been approved for treatment of diabetes in India, it should be further researched in diabetes and COVID-19, a subgroup where significant mortality has been shown.³⁸

Prevention:

No vaccine is available to prevent coronavirus disease for now (COVID-19) caused by SARS-CoV-2. The option for protection is to stay away from the exposure to virus. Moreover, generation of high level of awareness in the society and involvement of Government machinery will also go a long way in management of this epidemic.

1. Social distancing is of prime important measure.
2. Personal hygiene should be strictly followed.
3. Try to avoid contact with the mouth or mucous membrane, eyes, face, nose etc with unclean hands.
4. Specific immunoglobulin from cured patients of COVID19 should be collected and, under strict supervision, used for critically ill COVID-19-infected patients. In future, this may be considered as a standard therapy protocol for the treatment of any unknown viral pandemic.³⁹
5. Use of Personal Protection Equipment. (PPE)
6. Appropriate use of disinfectants for disinfection of surfaces and proper methods of mopping surfaces, sterilization of equipment.

7. The collection, segregation and transport of samples or infectious waste from covid-19 patients should be done under the guidance of the infection control/Biomedical Waste Management of the institute.⁴⁰
8. Follow WHO, ICMR, MCI, DCI guidelines.
9. Reinforce standard hygiene practices.
10. Close monitoring and large scale control strategies

Conclusion: India is still in the early stage this epidemic with the low growth rate compared to other countries. Immediate implementation of non-pharmacological interventions, complete lockdown, has maximum potentials to decrease the positive cases, reduce hospitalizations, ICU and ventilators requirements, mortality rate and save the world from this pandemic. The containment of spread is the most crucial determinant of the final morbidity from this COVID-19 pandemic. In this crisis it is important to gain the more and more information or update the existing knowledge regarding the same.

References:

1. Heini Utunen, Ngouille Ndiaye, Richelle George, Corentin Piroux, Melissa Attias, Gaya Gamhewage. Launch and global reach of an online COVID-19 course in multiple languages on OpenWHO in the first quarter of 2020. JMIR Preprints 03/04/2020:19076 available from DOI: <https://doi.org/10.2196/preprints.19076>.
2. Deblina Roy , Sarvodaya Tripathya , Sujita Kumar Kara, Nivedita Sharmaa, Sudhir Kumar Vermaa , Vikas Kaushalb. Study of knowledge, attitude, anxiety & perceived mental healthcare need in Indian population during COVID-19 pandemic. Asian Journal of Psychiatry 2020; 51:1-7.
3. Won Sriwijitalaia, Viroj Wiwanitkit. Hearing loss and COVID-19: A note. Am J Otolaryngol available from <https://doi.org/10.1016/j.amjoto.2020.102473>.
4. Vellingiri B *et al* COVID-19: A promising cure for the global panic. Science of the Total Environment. Available from DOI: <https://doi.org/10.1016/j.scitotenv.2020.138277>.
5. Akriti Singh, Altamash Shaikh , Ritu Singh, Awadhesh Kumar Singh. COVID-19: From bench to bed side. Diabetes & Metabolic Syndrome: Clinical Research & Reviews 2020;14:277-81.

6. Asim Biswasa, Uttaran Bhattacharjeea, Alok Kumar Chakrabartia, Devendra Nath Tewaria , Hasina Banub, Shanta Duttac. Emergence of Novel Coronavirus and COVID-19: whether to stay or die out? *Critical Reviews in Microbiology* 2020;1-12.
7. Chan JF, Yuan S, Kok KH, To KK, Chu H, Yang J, et al. A familial cluster of pneumonia associated with the 2019 novel coronavirus indicating person-to-person transmission: a study of a family cluster. *Lancet* 2020;395(10223):514–23.
8. Huang R, Xia J, Chen Y, Shan C, Wu C. A family cluster of SARS-CoV-2 infection involving 11 patients in Nanjing, China. *Lancet Infect Dis* 2020. doi:10.1016/S1473-3099(20)30147-X
9. Lillie PJ, Samson A, Li A, Adams K, Capstick R, Barlow GD, et al. Novel coronavirus disease (Covid-19): the first two patients in the UK with person to person transmission. *J Infect* 2020. doi:10.1038/s41586-020-2012-7
10. Awadhesh Kumar Singh, Ritesh Gupta, Amerta Ghosh, Anoop Misra. Diabetes in COVID-19: Prevalence, pathophysiology, prognosis and practical considerations. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews* 2020;14: 303-10.
11. Kshirsagar Minal M, Dodamani Arun S, Prashanth VK, Dodamani Girija A, Jadhav Harish C, Deshmukh Chetan V. Bioterrorism: A Global Threat. *JOHCD* 2016;10(2):52-8.
12. Ritu Gautam, Manik Sharma. 2019-nCoV pandemic: A disruptive and stressful atmosphere for Indian academic fraternity. *Brain, Behavior, and Immunity* available from <https://doi.org/10.1016/j.bbi.2020.04.025>.
13. Singhal T. A Review of Coronavirus Disease-2019 (COVID-19). *The Indian Journal of Pediatrics* 2020;87(4):281-6.
14. Arshi Islam, Anwar Ahmed, Irshad H. Naqvi, Shama Parveen. Emergence of deadly severe acute respiratory syndrome coronavirus-2 during 2019–2020. *Indian Virological Society* 2020 available from <https://doi.org/10.1007/s13337-020-00575-1>.
15. Gupta N *et al* Clinical and epidemiologic profile of the initial COVID-19 patients at a tertiary care centre in India. *Monaldi Archives for Chest Disease* 2020;90(1294):193-6.

16. Banerjee AK, Arora N. Coronavirus Disease (COVID-19) Pandemic: A Race Against Time. *Current Topics in Medicinal Chemistry*, 2020;20:1-4.
17. Zarir F. Udwadia, Reyma Sara Raju. How to protect the protectors: 10 lessons to learn for doctors fighting the COVID-19 coronavirus. *Medical Journal Armed Forces India*, available from <https://doi.org/10.1016/j.mjafi.2020.03.009>.
18. . Wu D, Wu T, Liu Q, Yang Z. The SARS-CoV-2 outbreak: what we know. *Int J Infect Dis*. 2020 Mar. S1201971220301235
19. Sagarika Kamath, Rajesh Kamath, Prajwal Salins. COVID-19 pandemic in India: challenges and silver linings. *Postgrad Med J* 2020:1-2.
20. Dutta PK. Challenge to fighting coronavirus in India: 36% wash hands with soap before a meal, 2020. Available: <https://www.indiatoday.in/coronavirusoutbreak/story/challenge-to-fighting-coronavirus-in-india-36-wash-hands-with-soap-before-a-meal1660295-2020-03-27>.
21. Saaliq S. Limited clean water access in India spawns COVID-19 concerns, 2020. Available: <https://time.com/5805534/india-clean-water-hygiene-coronavirus>
22. Kaustuv Chatterjee, Kaushik Chatterjee, Arun Kumar, Subramanian Shankar. Healthcare impact of COVID-19 epidemic in India: A stochastic mathematical model. *Medical Journal Armed Forces India*, available from <https://doi.org/10.1016/j.mjafi.2020.03.022>.
23. Laxminarayan R. What India needs to fight the virus, 2020. Available: <https://www.nytimes.com/2020/03/27/opinion/india-coronavirus-lockdown.htm>.
24. Samit Ghosal, Sumit Sengupta, Milan Majumder, Binayak Sinha. Linear Regression Analysis to predict the number of deaths in India due to SARS-CoV-2 at 6 weeks from day 0 (100 cases - March 14th 2020) *Diabetes & Metabolic Syndrome: Clinical Research & Reviews* 2020;14: 311-5.
25. Govindasamy Agoramoorthy. India fights hard to neutralize the spread of Covid-19. *Infection Control & Hospital Epidemiology* available from DOI: 10.1017/ice.2020.140.
26. Rakesh Lodha, S. K. Kabra. COVID-19: How to Prepare for the Pandemic? *Indian J Pediatr* available from <https://doi.org/10.1007/s12098-020-03293-0>.

27. Suneela Garg , Nidhi Bhatnagar, Navya Gangadharan. A Case for Participatory Disease Surveillance of the COVID-19 Pandemic in India. JMIR Public Health Surveill 2020;6(2):1-5.
28. : Haleem A-n et al., Effects of COVID-19 pandemic in daily life, Current Medicine Research and Practice, available from <https://doi.org/10.1016/j.cmrp.2020.03.011>.
29. Santanu Bandyopadhyay. Coronavirus Disease 2019 (COVID-19): we shall overcome. Clean Technologies and Environmental Policy available from <https://doi.org/10.1007/s10098-020-01843-w>.
30. R. Varalakshmia, K. Arunachalam. COVID 2019 – Role of faculty members to keep mental activeness of students. Asian Journal of Psychiatry 2020;51:1-2.
31. Kumar SR. Dead body management in times of Covid-19 and its potential impact on the availability of cadavers for medical education in India. available from doi: 10.1002/ASE.1962.
32. Dae-Gyun Ahn *et al* Current Status of Epidemiology, Diagnosis, Therapeutics, and Vaccines for Novel Coronavirus Disease 2019 (COVID-19). J. Microbiol. Biotechnol 2020;30(3):313–24.
33. Latika Gupta, Durga Prasanna Misra, Vishwesh Agarwal, Suma Balan, Vikas Agarwal. Management of rheumatic diseases in the time of covid-19 pandemic: perspectives of rheumatology practitioners from India. Ann Rheum Dis Month 2020 doi:10.1136/annrheumdis-2020-217509.
34. Phulen Sarma *et al* Virological and clinical cure in covid-19 patients treated with hydroxychloroquine: a systematic review and meta-analysis. Available from doi: 10.1002/jmv.25898.
35. Teixeira da Silva JA, Convalescent plasma: A possible treatment of COVID-19 in India, Medical Journal Armed Forces India, available from <https://doi.org/10.1016/j.mjafi.2020.04.006>.
36. Kalpana Panati, Venkata Ramireddy Narala. COVID-19 Outbreak: an Update on Therapeutic Options. SN Comprehensive Clinical Medicine available from <https://doi.org/10.1007/s42399-020-00264-6>.
37. Wang M, Cao R, Zhang L, Yang X, Liu J, Xu M, et al. Remdesivir and chloroquine effectively inhibit the recently emerged novel coronavirus (2019-nCoV) in vitro. Cell Res. 2020;30(3):269–71.
38. Awadhesh Kumar Singh, Akriti Singh, Altamash Shaikh , Ritu Singh , Anoop Misra. Chloroquine and hydroxychloroquine in the treatment of COVID-19 with or without diabetes: A systematic search and a narrative review with a special reference to India and other developing countries. Diabetes & Metabolic Syndrome: Clinical Research & Reviews 2020;14:241-6.

39. Sudipto Chatterjee. Important Steps to Control COVID-19/SARS-CoV-2 Infection. SN Comprehensive Clinical Medicine available from <https://doi.org/10.1007/s42399-020-00271-7>.
40. Rishi Kumar Bali, Kirti Chaudhry. Maxillofacial surgery and COVID-19, The Pandemic!! J. Maxillofac. Oral Surg available from <https://doi.org/10.1007/s12663-020-01361-8>.