



THE IMPACT OF COVID - 19 ON CANCER CARE

Dr. A. Indira Priyadarsini¹ & Dr. I.S. Chakrapani²

1 Asst Professor. Dept. of Botany, SVA Govt. College, Srikalahasti, Chittoor dist. AP

2 Asst. Professor: Dept. of Zoology, PRR & VS Govt. College, Vidavalur, Nellore, AP

Correspondence: ischakrapani@gmail.com²

ABSTRACT:

Emergence of novel corona virus (SARS-CoV-2) in 2019 has marked the third major event after Severe Acute Respiratory Syndrome Corona virus (SARS-CoV) in 2002 and the Middle East Respiratory Syndrome Coronavirus (MERS-CoV) that introduced pathogenic coronavirus into human populations on a global scale. The disease caused by SARS-CoV2 is named Corona Virus Disease (COVID-19). This pandemic spread over 205 countries including India and has become a public health emergency. As on 06th April 2020, 3577 cases are reported in India, out of which 83 died. While the Govt. of India is taking all the measures including lock down, to control the pandemic, efforts have been intensified to device low-cost indigenous testing kits and discover potential therapeutic agents to combat the pandemic successfully. The present paper reviews the impact of COVID-19 on cancer patients suggests measures needed to help in this emergency.

Key Words: COVID-19; Corona virus; Lock down; Health emergency; Public health

INTRODUCTION:

The outbreak of novel corona virus - 2019 was first reported on December 31, 2019 from Wuhan city of Hubei province in China¹. The outbreak started as a cluster of pneumonia cases, caused by a new Corona virus². Number of new cases are reported all over the world, including India. On 30th January 2020, the World Health Organization (WHO) declared global Public Health Emergency³. There have been many remedial measures taken by government of various countries across the world, which include travel restriction, awareness campaigns, timely release of guidelines & health bulletins by authorities and even lock down.

CORONA VIRUSES:

Corona viruses are positive sense RNA viruses, having spike like projections on the surface which render them a crown like appearance⁴. In the past, two major outbreaks of coronavirus infection caused much damage. In 2002, Severe Acute Respiratory Syndrome (SARS) coronavirus⁵ and in 2012 Middle East Respiratory Syndrome coronavirus (MERS-CoV)⁶ emerged causing potentially life-threatening respiratory tract infections⁷.

NOVEL CORONA VIRUS-2019 AND ITS TRANSMISSION:

The novel corona virus responsible for COVID-19 also belong to β -genera of corona viruses. This belongs to the subgenus *sarbecovirus*, subfamily

orthocoronavirinae⁸ and is named as SARS-CoV-2, by the Corona Virus Group (CSG) of the International Committee on Taxonomy of Viruses⁹. The genome of the SARS-CoV-2 was sequenced¹⁰, and it is found to have 79 % similarity with the genome of SARS-CoV and 96.2% similarity to a bat CoV RaTG13¹¹. As per the availability of data as on the date of writing this paper, it is assumed that the SARS-CoV-2 might have transmitted from bats, which are the most likely reservoirs, to human beings, employing an unknown intermediate host^{12,13}. Studies reveal that the new virus emerged as solitary species jump from possibly a mammalian intermediary host¹⁴. It is established by now that the SARS-CoV-2 infects humans utilizing the angiotensin converting enzyme 2 (ACE 2) as the receptor¹¹. Probably the bat coronavirus and novel corona virus might have emerged from same ancestor¹⁵.

The basic reproduction number (Ro) of the novel corona virus is estimated to be about 2.2¹⁶ or even more. Evidences of pneumonia cases indicate the human-to-human transmission of this virus¹⁷, possibly through a mammalian intermediary host¹⁴. SARS-CoV-2 has 10-20 times higher affinity towards humans than SARS-CoV¹. The transmission is taking place at alarming rates. Nosocomial infection among healthcare workers and patients, contact-transmission among family members and droplet infection in crowded areas are of critical concern at this juncture.

COVID-19 CLINICAL SYMPTOMS:

The common clinical symptoms of COVID-19 infection include cough, tiredness, production of phlegm, sore throat, headache, fever and shortness of breath¹⁸. Fever and cough are dominant, while diarrhoea and vomiting seem less common¹⁹. Manifestation of the disease suggests that viral tropism differs among SARS-CoV-2²⁰, SARS CoV²¹, MERS-CoV²² and influenza²³. While a few of the patients were quite asymptomatic, few others developed acute respiratory distress syndrome, septic shock, multi organ dysfunction and metabolic acidosis that was difficult to correct²⁴. Disease progression is associated with high levels of inflammatory cytokines²⁵. While majority of the patients exhibit lymphocytopenia^{26,27}, severely affected patients showed renal involvement²⁸. Elderly male patients, who have comorbidities showed higher death rate and risk as well²⁹. The overall fatality rate is apparently less, between 2-3%³⁰, but the absolute numbers are very high. Neonates and

elderly people must be taken care of to reduce the death rates due to COVID-19. Therapies aiming to disturb virus entry into host may prove good to combat the disease³¹.

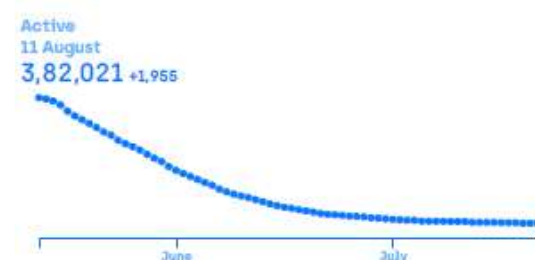
COVID -19 IN INDIA:

The first COVID-19 case in India was recorded in Kerala state on 30th January 2020³². By 2nd February 2020 two more cases were recorded. Then there was a brief pause, and by 07th March 2020 the number of cases raised to 34. There has been a steady increase in the number of cases. On 06th April 2020, at 16.58pm, the number of cases all over India raised to 4067 (Image 1) as per the announcement of Ministry of Health and Family Welfare, Govt of India (GOI)³². There has been a steady raise in the number of cases, and the situation is alarming, as it is globally.

The Govt. of India has taken good measures to contain COVID - 19 transmission including the lockdown imposed on 23rd March 2020, after a one-day Janata curfew call given by the Prime Minister of India. GOI has taken a number of good initiatives including regular announcements, awareness programmes on use of sanitisers, social distancing & home quarantines, and issue of advisories and release of various guidelines for management of the disease outbreak and related issues from time to time. As of 05th April 2020, India is classified as being in local transmission stage by World Health organization (WHO)³³. The second wave badly hit India in the month of March 2021, with the COVID-19 spreading to the nook and corners of the country. Many casualties happened, and people in the age group of 21-45 were even affected worst.

Gradually the curve was flattened among hue and cry of a possible third wave. As on 12th August 2021, at 8.00 am IST, there were 3,87,987 active cases reported with a net positivity rate of 1.2%³⁴.

Image 1: Spread of COVID-19 in India as on 12th Aug 2021



(Source:., <https://www.covid19india.org/> accessed on 12.08.2021; 11:35 am)

IMPACT OF COVID ON CANCER PATIENTS:

With the spread of COVID-19, governments have taken various measures from limited restrictions to lockdowns across Indian states. Mobility of people was curtailed. Transborder movement of people was affected. Many decisions had to be taken to safeguard public health at large, sacrificing economic interests. People suffered a lot due to lack of timely access to amenities, resources, health care services. Mass migrations of people were witnessed.

Healthcare providers strived hard to meet the demands. Many people restrained themselves from routine clinical investigations, screening, diagnosis and treatment for non-COVID 19 diseases. So also, people suffering from various cancers could not access health care facilities. The impact of COVID-19 on cancer patients is of concern.

Cancer is characterized by uncontrolled cell growth and their spread to other parts of the body³⁵. It is a set of diseases and the prognosis is influenced by the timing of diagnosis and intervention³⁶. There has been an unprecedented competition for health-care facilities during the COVID-19 outbreak, and oncology professionals have had to protect the most vulnerable from a potentially fatal pandemic. The general principle of risk-to-benefit ruled the prioritization of utilization of health-care facilities³⁷. Since the onset of pandemic, there is a steep drop in cancer diagnosis across the world³⁶. Studies show there has been a decline in the number of tests to screen for cervical, breast and colon cancer by 85 per cent or more after the first Covid-19 cases were diagnosed in India³⁸.

A drop-in diagnosis and reported number of cases does not necessarily reflect a drop-in incidence of the disease. Many surgeries were cancelled during the pandemic period. Delays in cancer screening and treatment is expected to cause 10000 more deaths over the next decade³⁹. Not only cancer care, but also research was impacted much during the time. The vulnerable population of cancer patients suffered a lot due to reduction in the number of outpatient clinics, elective procedures, and from discharging patients from inpatient services^{40,41}.

In spite of the above, there have been certain positive effects. People accessed diagnostic and therapeutics nearby, avoiding journey. This led to a diversified approach in treating cancer patients. Three tiered approach of giving health care to low, medium and high priority regimens is developed⁴⁰. Telehealth and virtual medicine are more utilized.

CONCLUSION:

Fighting against COVID-19 is no mean to a world war. Fight against the spread of this disease is almost a war without weapons. In these times, a coherent effort from all the stakeholders – policy makers, health care professionals, scientists, educationists and the general public is the need of the hour to contain the pandemic.

Since cancer patients are vulnerable and prone to many an illness, it is time to revisit the priorities of providing health care during the pandemic times. A congenial way of balancing the provision of cancer care while minimizing exposure risk to COVID-19 must be developed.

REFERENCES:

- https://creatives.thehindu.com/covid_19_ebook.pdf accessed on 06 April 2020.
- Lu R, Zhao X, Li J, Niu P, Yang B, Wu H, et al. Genomic characterisation and epidemiology of 2019 novel coronavirus: implications for virus origins and receptor binding. *Lancet*. 2020;395(10224):565–74
- World Health Organization (WHO). Coronavirus disease (COVID-2019) Situation Report-39: WHO; 2020. <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports/>. Accessed 06 April 2020.
- Sunil K Lal (ed) *Molecular biology of the SARS coronavirus*, Springer, London. 2010. 330p. DOI 10.1007/978-3-642-03683-5
- Richman DD, Whitley RJ, Hayden FG. *Clinical Virology*, 4th ed. Chan-Yeung M, Xu RH. SARS: epidemiology. *Respirology*. 2003;8:S9–14.
- Middle East Respiratory Syndrome Coronavirus. Available at: <https://www.who.int/emergencies/mers-cov/en/>. Accessed 05 April 2020.
- Yin Y, Wunderink RG. MERS, SARS and other coronaviruses as causes of pneumonia. *Respirology*. 2018;23(2):130–78.
- Zhu N, Zhang D, Wang W, Li X, Yang B, Song J, et al. A novel coronavirus from patients with pneumonia in China, 2019. *N Engl J Med*. 2020;382(8):727–33.
- Coronaviridae Study Group of the international Committee on Taxonomy of Viruses, The species Severe acute respiratory syndrome-related coronavirus: classifying 2019-nCoV and naming it SARS-CoV-2, *Nature Microbiology*, 2020 5: 536-544 .
- Lu R, Zhao X, Li J, Niu P, Yang B, Wu H, et al. Genomic characterisation and epidemiology of 2019 novel coronavirus: implications for virus

- origins and receptor binding. *Lancet*. 2020;395(10224):565–74
11. Zhou P, Yang XL, Wang XG, Hu B, Zhang L, Zhang W, et al. A pneumonia outbreak associated with a new coronavirus of probable bat origin. *Nature*.2020. <https://doi.org/10.1038/s41586-020-2012-7>.
 12. Giovanetti M, Benvenuto D, Angeletti S, Ciccozzi M. The first two cases of 2019-nCoV in Italy: where they come from? *J Med Virol*. 2020:1–4. <https://doi.org/10.1002/jmv.25699> [Epub ahead of print].
 13. Paraskevis D, Kostaki EG, Magiorkinis G, Panayiotakopoulos G, Sourvinos G, Tsiodras S. Full-genome evolutionary analysis of the novel corona virus (2019-nCoV) rejects the hypothesis of emergence as a result of a recent recombination event. *Infect Genet Evol*. 2020;79:104212.
 14. <http://virological.org/t/phylo-dynamic-analysis-176-genomes-6-mar-2020/356> accessed on 08 April 2020
 15. Paraskevis D, Kostaki EG, Magiorkinis G, Panayiotakopoulos G, Sourvinos G, Tsiodras S. Full-genome evolutionary analysis of the novel corona virus (2019-nCoV) rejects the hypothesis of emergence as a result of a recent recombination event. *Infect Genet Evol*. 2020;79:104212.
 16. Riou J, Althaus CL. Pattern of early human-to-human transmission of Wuhan 2019 novel coronavirus (2019-nCoV), December 2019 to January 2020. *Euro Surveill*. 2020;25(4):2000058. <https://doi.org/10.2807/1560-7917.ES.2020.25.4.2000058>.
 17. 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.
 18. Guan WJ, Ni ZY, Hu Y, Liang WH, Ou CQ, He JX, et al. Clinical characteristics of coronavirus disease 2019 in China. *N Engl J Med*. 2020. <https://doi.org/10.1056/NEJMoa2002032>.
 19. Wu F, Zhao S, Yu B, Chen YM, Wang W, Song ZG, et al. A new coronavirus associated with human respiratory disease in China. *Nature*. 2020. <https://doi.org/10.1038/s41586-020-2008-3> [Epub ahead of print].
 20. Yan-Rong Guo, Qing-Dong Cao, Zhong-Si Hong, Yuan-Yang Tan, Shou-Deng Chen, Hong-Jun Jin, Kai-Sen Tan, De-Yun Wang and Yan Yan. The origin, transmission and clinical therapies on coronavirus disease 2019 (COVID-19) outbreak – an update on the status. *Military Medical Research* (2020) 7:11 <https://doi.org/10.1186/s40779-020-00240-0>
 21. Lee N, Hui D, Wu A, Chan P, Cameron P, Joynt GM, et al. A major outbreak of severe acute respiratory syndrome in Hong Kong. *N Engl J Med*. 2003; 348(20):1986–94.
 22. Assiri A, Al-Tawfiq JA, Al-Rabeeh AA, Al-Rabiah FA, Al-Hajjar S, Al-Barrak A, et al. Epidemiological, demographic, and clinical characteristics of 47 cases of Middle East respiratory syndrome coronavirus disease from Saudi Arabia: a descriptive study. *Lancet Infect Dis*. 2013;13(9):752–61.
 23. Wang H, Xiao X, Lu J, Chen Z, Li K, Liu H, et al. Factors associated with clinical outcome in 25 patients with avian influenza A (H7N9) infection in Guangzhou, China. *BMC Infect Dis*. 2016;16(1):534.
 24. Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *Lancet*. 2020;395(10223):497–506.
 25. Chen N, Zhou M, Dong X, et al. Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study. *Lancet*. 2020;395:507–13.
 26. Guan WJ, Ni ZY, Hu Y, Liang WH, Ou CQ, He JX, et al. Clinical characteristics of coronavirus disease 2019 in China. *N Engl J Med*. 2020. <https://doi.org/10.1056/NEJMoa2002032>.
 27. Kui L, Fang YY, Deng Y, Liu W, Wang MF, Ma JP, et al. Clinical characteristics of novel coronavirus cases in tertiary hospitals in Hubei Province. *Chin Med J*. 2020. <https://doi.org/10.1097/CM9.0000000000000744> [Epub ahead of print].
 28. Rohollah Valizadeh, Azar Baradaran, Azin Mirzazadeh, Lakkakula VKS Bhaskar. Coronavirus-nephropathy; renal involvement in COVID-19. *Journal of Renal Injury Prevention* 2020; 9(2): e18. doi: 10.34172/jrip.2020.18
 29. Gao HN, Lu HZ, Cao B, Du B, Shang H, Gan JH, et al. Clinical findings in 111 cases of influenza A (H7N9) virus infection. *N Engl J Med*. 2013;368(24):2277–85.
 30. Coronavirus Outbreak. Available at: <https://www.worldometers.info/coronavirus/>. Accessed 07 April 2020.
 31. N Sreenivas, I S Chakarpani, P Anil Kumar. The Paradigm of entry into host - Concerns in developing antivirals for COVID-19. *Journal of Interdisciplinary Cycle Research*, Volume XII, Issue IV, April/2020, 159-167
 32. <https://www.mohfw.gov.in/> accessed on 06.04.2020; 16.38 GMT+5.30
 33. https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200405-sitrep-76-covid-19.pdf?sfvrsn=6ecf0977_2 accessed on 06.04.2020
 34. <https://google.com/covid19-map/?hl=en> accessed on 08.04.2020
 35. <https://www.covid19india.org/>
 36. <https://www.cancer.gov/about-cancer/understanding/what-is-cancer#definition>
 37. Norman E Sharpless COVID-19 and cancer. *Science* 19 Jun 2020: Vol. 368, Issue 6497, pp. 1290 DOI: 10.1126/science.abd3377
 38. 4. ESMO Cancer patient management during the COVID-19 pandemic. <https://www.esmo.org/guidelines/cancer-patient-management-during-the-covid-19-pandemic>
 39. <https://indianexpress.com/article/lifestyle/health/coronavirus-pandemic-impact-of-covid-19-on-cancer-care-7347415/>
 40. 4. ESMO Cancer patient management during the COVID-19 pandemic. <https://www.esmo.org/guidelines/cancer-patient-management-during-the-covid-19-pandemic>
 41. Schrag D, Hershman DL, Basch E: Oncology practice during the COVID-19 pandemic. *JAMA*

323:2005-2006, 2020 [Crossref](#), [Medline](#), [Google Scholar](#)

42. van de Haar J, Hoes LR, Coles CE, et al: Caring for patients with cancer in the COVID-19 era. Nat Med 26:665-671, 2020 [Erratum: Nat Med 26:1146, 2020] [Google Scholar](#)

CONTRIBUTORS:

Dr.I.S.Chakrapani received his Ph.D (Zoology) from Sri Venkateswara university, Tirupati. He is presently working as Asst.Professor, Department of Zoology, PRR & VS Govt. College, Vidavalur, Nellore district, AP, India. He is working in the fields of Biodiversity & Conservation of Herpetofauna, Biomedical waste management, Phylogenetics & Epidemiology.

He has contributed to the concept & manuscript preparation of the paper, data collection and analysis.

Dr. A. Indira Priyadarsini received her **M.Tech** (Biotechnology) from Jawahar Lal Nehru Technological University, Hyderabad, and **Ph.D** from Bharathiar University, Coimbatore. She is working as Asst.Professor, Department of Botany, SVA Govt. Degree & PG College, Srikalahasti. Her research interests include Molecular biology of viruses, Ethnobotany & Phytodiversity studies, Phytomedicine, Bio-informatics and drug design.

She has contributed to data collection & analysis and interpretation.

