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A NOVEL VIRUS COVID-19

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Abstract: There is a brand-new public fitness crisis threatening the arena with the emergence and unfold of 2019 novel coronavirus (2019-nCoV) or the extreme acute breathing syndrome coronavirus 2 (SARS CoV-2). The virus originated in bats and become transmitted to human beings via but unknown intermediary animals in Wuhan, Hubei province, China in December 2019. There were round 96,000 stated instances of coronavirus ailment 2019 (COVID-2019) and 3300 stated deaths to date (05/03/2020). The disease is transmitted through inhalation or touch with inflamed droplets and the incubation length levels from 2 to 14 d. The signs and symptoms are normally fever, cough, sore throat, breathlessness, fatigue, malaise among others. The disease is moderate in maximum people; in some (normally the aged and people with comorbidities), it might also additionally development to pneumonia, acute respiration distress syndrome (ARDS) and multi organ dysfunction.

Keywords – SARS CoV 2, Corona Virus, Life Cycle of COVID-19, Types of Corona Virus, Treatment of COVID-19.

I. INTRODUCTION

- The 2019 novel coronavirus (2019-nCoV) or the intense acute breathing syndrome corona virus 2 (SARS-CoV-2) as it's miles now called, is unexpectedly spreading from its origin in Wuhan City of Hubei Province of China to the relaxation of the world.[1]
- Till 05/03/2020 round 96,000 instances of coronavirus sickness 2019 (COVID-19) and 3300 deaths were said.[2]
- India has said 29 instances until date. Fortunately so far, kids were occasionally affected without a deaths. But the destiny path of this virus is unknown. This article offers a bird's eye view approximately this new virus. Since understanding approximately this virus is unexpectedly evolving, readers are entreated to replace themselves regularly.

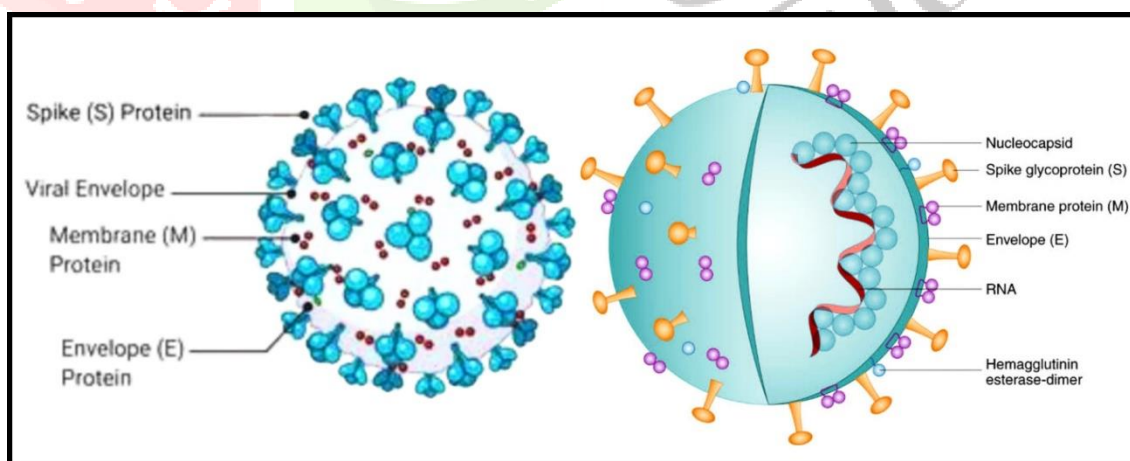


Fig. 1: - Structure of COVID-19 Virus

II. HISTORY

- T Coronaviruses are enveloped high-quality experience RNA viruses starting from 60 nm to 140 nm in diameter with spike like projections on its floor giving it a crown like look below the electron microscope; therefore the call coronavirus.[3]
- Four corona viruses specifically HKU1, NL63, 229E and OC43 had been in stream in people, and typically reason moderate breathing disease.
- There had been occasions within the beyond a long time in which crossover of animal betacoronavirus to people has ended in excessive disease.
- The first such example turned into in 2002–2003 while a brand new coronavirus of the β genera and with beginning in bats crossed over to people through the middleman host of palm civet cats in the Guangdong province coronavirus

- This virus, special as extreme acute breathing syndrome coronavirus affected 8422 humans generally in China and Hong Kong and precipitated 916 deaths (mortality price 11%) earlier than being contained.[4]
- Almost a decade later in 2012, the Middle East breathing syndrome coronavirus (MERS-CoV), additionally of bat beginning, emerged in Saudi Arabia with dromedary camels because the intermediate host and affected 2494 humans and precipitated 858 deaths (fatality price 34%).

III. TYPES OF CORONA VIRUS

Coronaviruses belong to the subfamily Coronavirinae in The own circle of relatives Coronaviridae. Different forms of human Coronaviruses range in how extreme the ensuing disease. Becomes, and the way a long way they could spread. Doctors seven forms of coronavirus which can infect humans.

- Common Types
 1. 229E (alpha coronavirus)
 2. NL63 (alpha coronavirus)
 3. OC43 (beta coronavirus)
 4. HKU1 (beta coronavirus)[5]

IV. ORIGIN AND SPREAD OF COVID-19

- In December 2019, adults in Wuhan, capital of Hubei province and a main transportation hub of China commenced offering to neighborhood hospitals with extreme pneumonia of unknown cause.
- Many of the preliminary instances had a common publicity to the Huanan wholesale seafood marketplace that additionally traded stay animals.
- The surveillance system (positioned into region after the SARS outbreak) become activated and respiratory samples of sufferers had been dispatched to reference labs for etiologic investigations.
- December thirty first 2019, China notified the outbreak to the World Health Organization and on 1st January the Huanan sea grocery store become closed.
- On seventh January the virus become recognized as a coronavirus that had >95% homology with the bat coronavirus and > 70% similarity with the SARS- CoV.[1,2,6]
- Environmental samples from the Huanan sea grocery store additionally examined positive, signifying that the virus originated from ther of instances commenced growing exponentially, a number of which did now no longer have publicity to the stay animal marketplace, suggestive of the reality that human-to-human transmission become happening.[7,8]
- The first deadly case become mentioned on eleventh Jan 2020. The big migration of Chinese at some stage in the Chinese New Year fuelled the epidemic.
- Cases in different provinces of China, different nations (Thailand, Japan and South Korea in quick succession) had been mentioned in people who had been getting back from Wuhan.

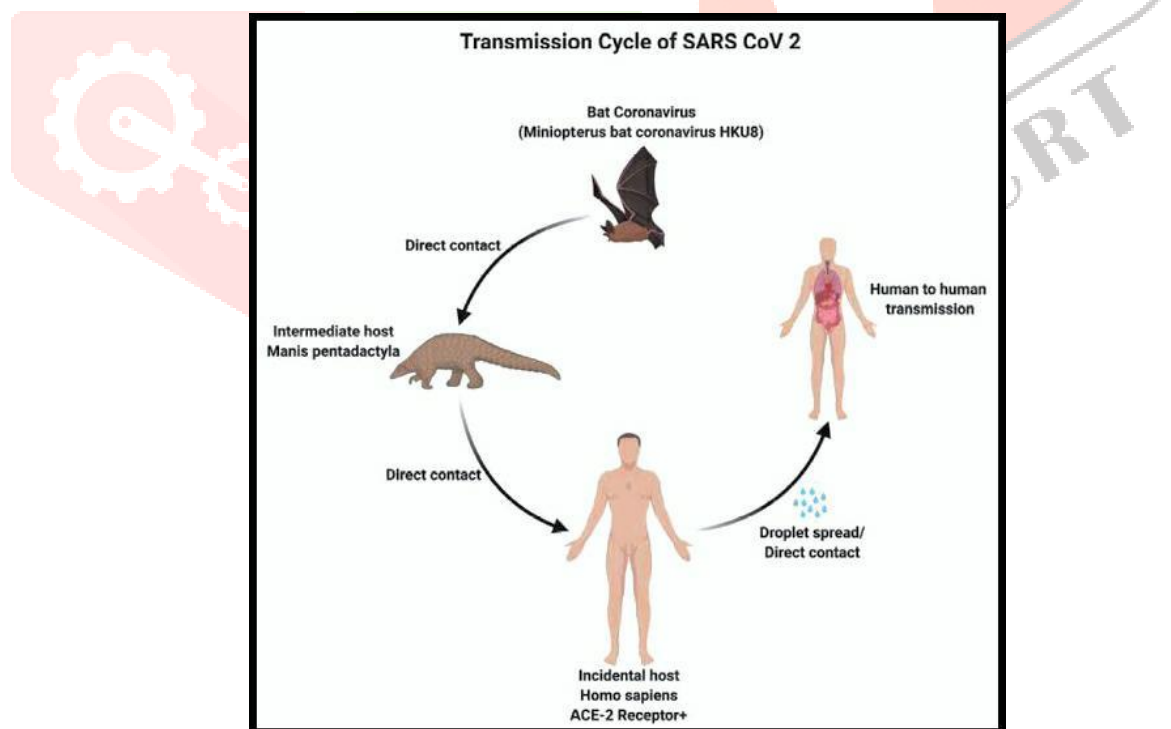


Fig. 2: - Transmission Cycle of SARS CoV - 2

- Transmission to healthcare employees being concerned for sufferers become defined on twentieth Jan, 2020. By twenty third January, the eleven million populace of Wuhan become located below lock down with regulations of access and go out from the region.
- Soon this lock down become prolonged to different towns of Hubei province. Cases of COVID-19 in nations out of doors China had been mentioned in people with no records of tour to China suggesting that neighborhood human-to-human transmission become happening in those nations.[9]

- Airports in distinct nations inclusive of India installed screening mechanisms to detect symptomatic human beings getting back from China and located them in isolation and trying out them for COVID-19. Soon it become obvious that the contamination will be transmitted from asymptomatic human beings and additionally earlier than onset of symptoms.
- Therefore, international locations along with India who evacuated their residents from Wuhan thru special flights or had visitors coming back from China, positioned all and sundry symptomatic or in any other case in isolation for 14 d and examined them for the virus. Cases persisted to growth exponentially and modelling research pronounced a virus doubling time of 1.8 d [10].
- In truth at the twelfth of February, China modified its definition of showed instances to include sufferers with negative/ pending molecular checks however with clinical, radiologic and epidemiologic functions of COVID-19 main to an growth in instances with the aid of using 15,000 in a single day.[6]
- As of 05/03/2020 96,000 instances worldwide (80,000 in China) and 87 different international locations and 1 worldwide conveyance (696, with inside the cruise deliver Diamond Princess parked off the coast of Japan) had been pronounced.[2]
- It is essential to be aware that whilst the range of latest instances has decreased in China lately, they have accelerated exponentially in different international locations along with South Korea, Italy and Iran.
- Of the ones inflamed, 20% are in important condition, 25% have recovered, and 3310 (3013 in China and 297 in different international locations) have died.[2]
- India, which had pronounced simplest three instances until 2/3/2020, has additionally visible a unexpected spurt in instances.
- By 5/3/2020, 29 instances were pronounced; generally in Delhi, Jaipur and Agra in Italian vacationers and their contacts. One case turned into pronounced in an Indian who traveled again from Vienna and uncovered a massive range of college youngsters in a birthday celebration at a town hotel. Many of the contacts of those instances had been quarantined.
- These numbers are likely an underestimate of the inflamed and lifeless because of obstacles of surveillance and testing. Though the SARS-CoV-2 originated from bats, the middleman animal thru which it crossed over to human beings is uncertain. Pangolins and snakes are the modern suspects.

V. EPIDEMIOLOGY AND PATHOGENESIS

- All a long time are susceptible. Infection is transmitted thru big droplets generated during coughing and sneezing with the aid of using symptomatic sufferers however also can arise from asymptomatic humans and earlier than onset of signs.[9]
- Studies have proven better viral hundreds with inside the nasal hollow space in comparison to the throat with no distinction in viral burden among symptomatic and asymptomatic humans.[12]

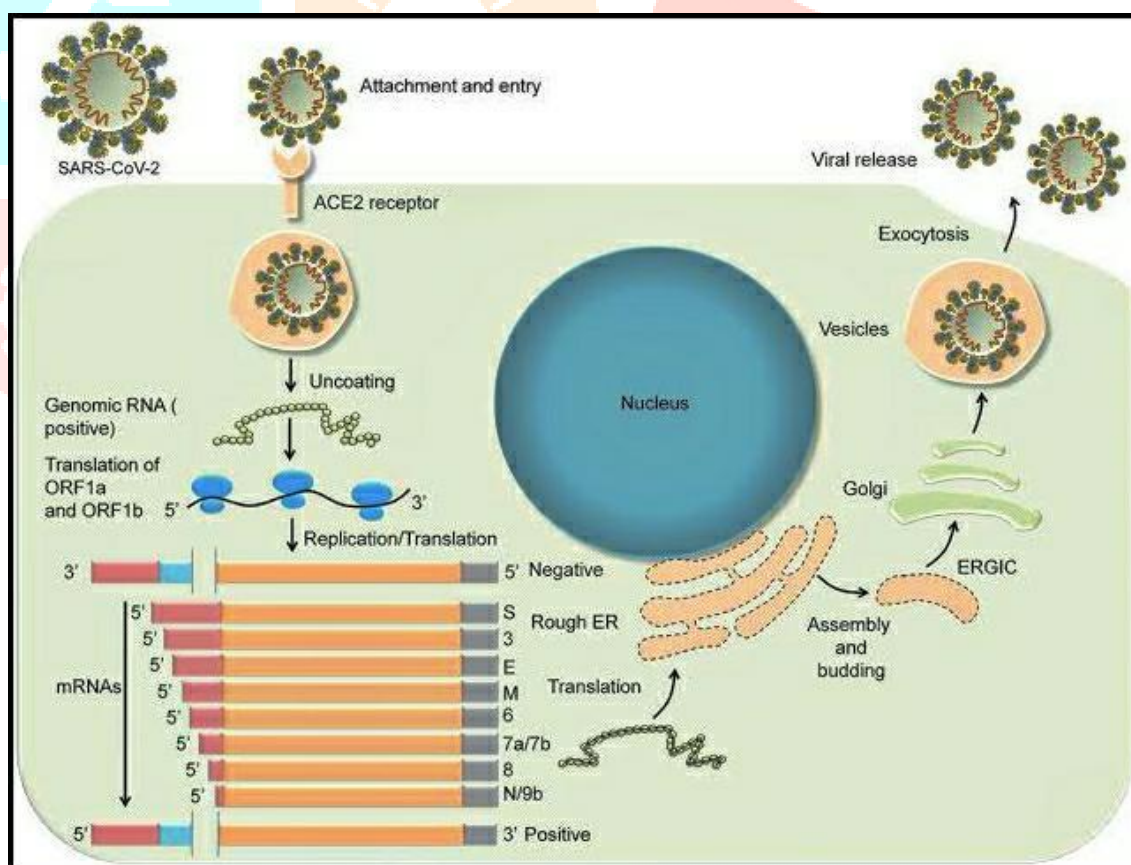


Fig. 3: - Life Cycle of SARS CoV – 2

- Patients may be infectious for so long as the signs final or even on scientific recovery. Some humans may also act as extremely good spreaders; a UK citizen who attended a convention in Singapore inflamed eleven different humans whilst staying in a lodge with inside the French Alps and upon go back to the UK.[6]
- These inflamed droplets can unfold 1–2 m and deposit on surfaces. The virus can continue to be viable on surfaces for days in beneficial atmospheric situations however are destroyed in much less than a minute with the aid of using common disinfectants like sodium hypochlorite, hydrogen peroxide etc.[13]
- Infection is received both with the aid of using inhalation of those droplets or touching surfaces infected with the aid of using them after which touching the nose, mouth and eyes.

- The virus is likewise present within side the stool and infection of the water deliver and subsequent transmission thru aerosolization/feco oral course is likewise hypothesized.[6]
- As consistent with cutting-edge information, transplacental transmission from pregnant girls to their fetus has now no longer been described.[14]
- However, neonatal disorder because of publish natal transmission is described.[14]
- The incubation duration varies from 2 to fourteen d [median 5 d]. Studies have recognized angiotensin receptor 2 (ACE2) because the receptor thru which the virus enters the breathing mucosa.[11]
- The fundamental case replica rate (BCR) is estimated to variety from 2 to 6.forty seven in numerous modelling studies.[11]
- In comparison, the BCR of SARS become 2 and 1.three for pandemic flu H1N1 2009.[2]

VI. CLINICAL FEATURES

- The scientific capabilities of COVID-19 are varied, starting from asymptomatic state to acute respiration misery syndrome and multi organ disorder.
- The common scientific capabilities consist of fever (now no longer in all), cough, sore throat, headache, fatigue, headache, myalgia and breathlessness. Conjunctivitis has additionally been described.
- Thus, they're indistinguishable from different respiration infections. In a subset of sufferers, through the cease of the primary week the sickness can development to pneumonia, respiration failure and demise.
- This development is related to intense upward push in inflammatory cytokines such as IL2, IL7, IL10, GCSF, IP10, MCP1, MIP1A, and TNF α . [15]
- The median time from onset of signs to dyspnea changed into 5 d, hospitalization 7 d and acute respiration misery syndrome (ARDS) 8 d.
- The want for in depth care admission changed into in 25–30% of affected sufferers in posted series.
- Complications witnessed covered acute lung injury, ARDS, surprise and acute kidney injury. Recovery began out within the second or third wk.
- The median period of medical institution live in folks who recovered changed into 10 d. Adverse results and demise are greater common withinside the aged and people with underlying co-morbidities (50–75% of fatal instances).
- Fatality charge in hospitalized person sufferers ranged from four to eleven%. The standard case fatality charge is envisioned to variety among 2 and 3%. [2]

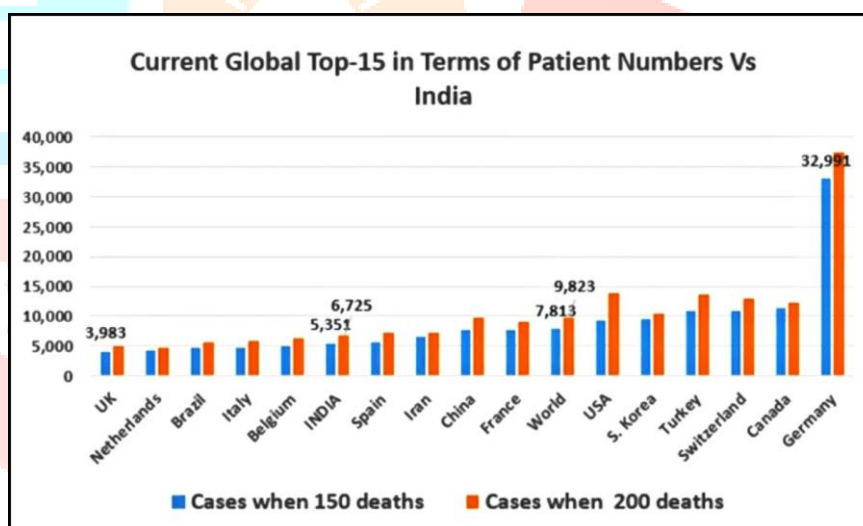


Fig. 4: - Current Global Top-15 in Terms of Patient Numbers Vs India

- Interestingly, sickness in sufferers out of doors Hubei province has been mentioned to be milder than the ones from Wuhan.[17]
- Similarly, the severity and case fatality charge in sufferers out of doors China has been mentioned to be milder.[6]
- This may also both be because of choice bias in which the instances reporting from Wuhan covered only the extreme instances or because of predisposition of the Asian populace to the virus because of higher expression of ACE2 receptors at the respiration mucosa.[11]
- Disease in neonates, toddlers and youngsters has been additionally mentioned to be drastically milder than their person counterparts. In a sequence of 34 youngsters admitted to a medical institution in Shenzhen, China among January nineteenth and February 7th, there had been 14 men and 20 females.
- The median age changed into 8 y 11 mo and in 28 youngsters the contamination changed into related to a own circle of relatives member and 26 youngsters had records of travel/house to Hubei province in China.[18]
- All the sufferers had been both asymptomatic (9%) or had moderate sickness. No extreme or crucial instances had been seen. The maximum not unusualplace signs had been fever (50%) and cough (38%).
- All sufferers recovered with symptomatic remedy and there had been no deaths.
- One case of extreme pneumonia and multiorgan disorder in a baby has additionally been mentioned.[19]
- Similarly the neonatal instances which have been mentioned were moderate.[20]

VII. TREATMENT

- The first step is to make certain ok isolation (mentioned later) to save you transmission to others contacts, sufferers and healthcare workers.[21]
- Mild infection must be controlled at domestic with counseling approximately chance signs.
- The regular standards are retaining hydration and nutrients and controlling fever and cough. Routine use of antibiotics and antivirals inclusive of oseltamivir must be averted in confirmed cases.[22]
- In hypoxic sufferers, provision of oxygen thru nasal prongs, face mask, excessive float nasal cannula (HFNC) or non-invasive air flow is indicated. Mechanical air flow or even extra corporeal membrane oxygen assist can be wished.[23]
- Renal alternative remedy can be wished in some. Antibiotics and antifungals are required if co-infections are suspected or proven.
- The function of corticosteroids is unproven; whilst modern-day global consensus and WHO advise in opposition to their use, Chinese recommendations do endorse quick time period remedy with low-to mild dose corticosteroids in COVID-19 ARDS .[24, 25]
- Detailed recommendations for crucial care control for COVID-19 had been posted through the WHO.[26]
- There is, as of now, no accepted remedy for COVID-19. Antiviral pills inclusive of ribavirin, lopinavir-ritonavir had been used primarily based totally at the enjoy with SARS and MERS.[27]
- In a ancient manage look at in sufferers with SARS, sufferers dealt with with lopinavir-ritonavir with ribavirin had higher consequences in comparison to the ones given ribavirin alone.[15]
- In the case collection of ninety nine hospitalized sufferers with COVID-19 contamination from Wuhan, oxygen became given to 76%, non-invasive air flow in 13%, mechanical air flow in 4%, extracorporeal membrane oxygenation (ECMO) in 3%, non-stop renal alternative remedy (CRRT) in 9%, antibiotics in 71%, antifungals in 15%, glucocorticoids in 19% and intravenous immunoglobulin remedy in 27%. [15]
- Antiviral remedy together with oseltamivir, ganciclovir and lopinavir-ritonavir became given to 75% of the sufferers. The period of non-invasive air flow became 4–22 d [median 9 d] and mechanical ventilation.
- For 3–20 d [median 17 d]. In the case collection of youngsters mentioned earlier, all youngsters recovered with fundamental remedy and did now no longer want in depth care.[17]
- There is anecdotal enjoy with use of remdeswir, a extensive spectrum anti RNA drug evolved for Ebola in control of COVID-19.[27]
- More proof is wanted earlier than those pills are recommended
- Other pills proposed for remedy are arbidol (an antiviral drug to be had in Russia and China), intravenous immunoglobulin, interferons, chloroquine and plasma of sufferers recovered from COVID-19.[21,28,29]
- Additionally, suggestions approximately the usage of conventional Chinese herbs discover location withinside the Chinese recommendations.[21]

VIII. PREVENTION

- Since presently there aren't any accepted remedies for this contamination, prevention is crucial.
- Houses of this virus make prevention hard namely, non-particular functions of the disease, the infectivity even earlier than onset of signs and symptoms withinside the incubation period, transmission from asymptomatic people, lengthy incubation period, tropism for mucosal surfaces which includes the conjunctiva, extended period of the infection and transmission even after scientific recovery.[30]
- Isolation of showed or suspected instances with slight infection at domestic is advocated
- The air flow at domestic ought to be right with daylight to permit for destruction of virus. Patients ought to be requested to put on a easy surgical masks and exercise cough hygiene.
- Caregivers ought to be requested to put on a surgical masks while withinside the identical room as affected person and use hand hygiene each 15–20 min.
- The finest chance in COVID-19 is transmission to healthcare employees. In the SARS outbreak of 2002, 21% of these affected had been healthcare employees.[31]
- Till date, nearly 1500 healthcare employees in China had been inflamed with 6 deaths. The doctor who first warned approximately the virus has died too.
- It is vital to guard healthcare employees to make certain continuity of care and to prevent transmission of contamination to different patients.
- While COVID-19 transmits as a droplet pathogen and is located in Category B of infectious agents (fantastically pathogenic H5N1 and SARS), with the aid of using the China National Health Commission, contamination manipulate measures advocated are the ones for class A agents (cholera, plague).
- Patients ought to be located in separate rooms or cohorted together. Negative stress rooms are now no longer commonly needed.
- The rooms and surfaces and gadget ought to go through ordinary decontamination ideally with sodium hypochlorite.
- Healthcare employees ought to be supplied with healthy examined N95 respirators and shielding fits and goggles.
- Airborne transmission precautions ought to be taken at some point of aerosol producing approaches which includes intubation, suction and tracheostomies.
- All contacts together with healthcare employees ought to be monitored for improvement of signs and symptoms of COVID-19.
- Patients may be discharged from isolation as soon as they're afebrile for at least 3 d and feature two consecutive terrible molecular checks at 1 d sampling interval.
- This advice isn't the same as pandemic flu wherein sufferers have been requested to resume work/college as soon as afebrile for twenty-four h or through day 7 of infection. Negative molecular checks have been now no longer a prerequisite for discharged
- At the network level, human beings need to be requested to keep away from crowded regions and put off non critical journey to locations with ongoing transmission.

- They need to be requested to exercise cough hygiene through coughing in sleeve/ tissue as opposed to hands and exercise hand hygiene often each 15–20 min.
- Patients with breathing signs and symptoms need to be requested to apply surgical mask. The use of masks through wholesome human beings in public locations has now no longer proven to guard towards breathing viral infections and is presently now no longer endorsed through WHO.
- However, in China, the general public has been requested to put on mask in public and specially in crowded locations and huge scale gatherings are prohibited (enjoyment parks etc). China is also thinking about introducing regulation to limit promoting and buying and selling of untamed animals.[32]
- T global reaction has been dramatic. Initially, there have been big journey regulations to China and those coming back from China/ evacuated from China are being evaluated for clinical signs and symptoms, remoted and examined for COVID-19 for two wks even though asymptomatic.
- However, now with fast international extensive unfold of the virus those journey regulations have extended to different countries. Whether those efforts will result in slowing of viral unfold isn't always known. A candidate vaccine is below development.
- Practice Points from an Indian Perspective. A the time of penning this article, the chance of coronavirus in India is extraordinarily low. But that may extrude withinside the following couple of weeks. Hence the subsequent is endorsed.
- Healthcare carriers need to take journey records of all sufferers with breathing signs and symptoms, and any global journey withinside the beyond 2 wks in addition to touch with ill human beings who've travelled internationally.
- They need to installation a machine of triage of sufferers with breathing infection withinside the outpatient branch and supply them a easy surgical masks to put on.
- They need to use surgical mask themselves at the same time as analyzing such sufferers and exercise hand hygiene often.
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Fig. 5: -Prevention Chart

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IX. CONCLUSION

- This new virus outbreak has Challenged the economic, scientific and public fitness infrastructure of China and to a few extent, of different international locations especially, its neighbor's.
- Time on my own will inform how the virus will effect our lives right here in India.
- More so, destiny outbreaks of viruses and pathogens of zoonotic starting place are possibly to continue.
- Therefore, aside from curtailing this outbreak, efforts must be made to plan comprehensive measures to save you destiny outbreaks of zoonotic starting place.

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