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REVIEW ARTICLE **OPEN ACCESS**

A Bird Eye view on Recent Covid-19 Data Reports Over Less Abundant Superficial Information

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ABSTRACT
Recent episode of Coronavirus (SARS-CoV-2) was first announced from Wuhan, China in late 2019. Its contamination proliferates around the world swiftly with a reformist pattern towards mortality of residents. Representing a potential danger to living beings, SARS-CoV-2 spread from animal to-human and then to general populace with manifestations ranging from mild to severe sick conditions and consequently numerous deaths, affirming two measures for proclaiming COVID-19 a pandemic. The disease shows a reformist pattern in symptomology, going from mild to serious pneumoniae to respiratory and multi-visceral failure that frequently shows pattern to death of patients with comorbidity within a short period of time. Escalated research endeavors on various parts of this human microbe are in progress across the globe towards clarifying viral transmission courses and the mechanisms employed to overcome host defense responses. With colossal infective potential, clinical examinations are being done enthusiastically to create compelling diagnostics and remedial mediations including re-purposing antiviral medicines and vaccine development. In this context, we depict the structural configuration of SARSCoV-2 genome; its pathogenicity, transmission; and we sum up risk appraisal and approaches applied in preventing infection. Lastly, we talk about significant parts of the improvement of diagnostic probes and restorative countermeasures that can possibly help in controlling the COVID-19 pandemic.
Key words: Pandemic, viral transmission, pathogenicity, vaccine, preventive measures, diagnostic probe.

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INTRODUCTION

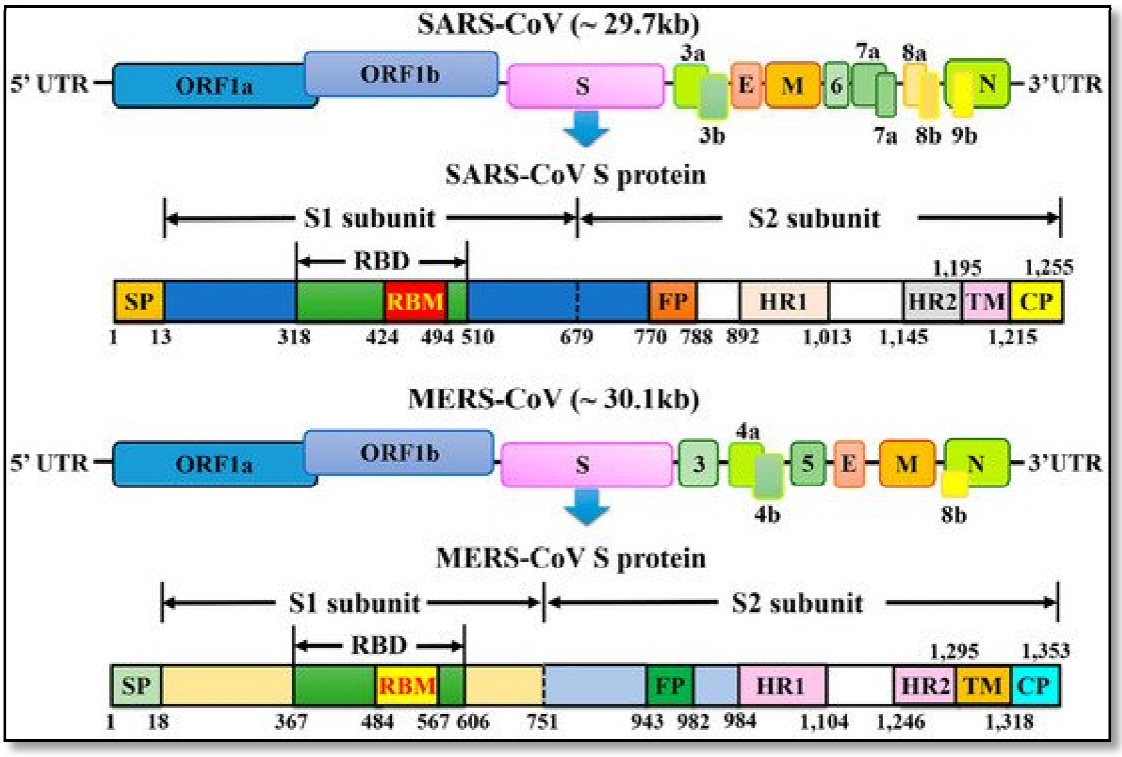
Pandemics of various infectious diseases with millions dying have been recorded in the history for the past several centuries. The most well known in the history have been pandemic due to plague in Asia and several pandemics of influenza that killed millions of people. [1-2] The pandemics continued in the current millennium too, and COVID-19 is the latestand certainly not the last pandemic. COVID-19 pandemic erupted in the Wuhan City of People's Republic of China in December 2019. The virus is being identified as a new coronavirus by Chinese officials [3]; which was later denoted as severe acute respiratory syndrome (SARS)-CoV-2 by the International Committee on Taxonomy of Viruses. [4] The WHO also named the disease due to this virus as COVID-19. [5]

DESCRIPTION OF COVID- 19 VIRUS

COVID-19is a β-coronavirus belonging to the family of *Coronaviridae*. [6] It is a zoonotic disease and was firstly identified in1965 (HCoV-229E). Thereafter two outbreaks of same potencies were occurred - in 2003 and 2012, respectively (SARS-CoV and MERSCoV). [7-8]
COVID-19 is a RNA type virus. According to the Phylogenetic studies, it is possible that the actual suspect of SARS-CoV-2 is another unidentified host instead of bats, which was possibly being sold at Wuhan seafood market before the outbreak. [9] However bat-SL-CoVZC45 and bat-SL-CoVZXC21 genomic sequences are 89% similar, there is a doubt regarding its direct ancestors. [10]

Genome sequences of different SARS-CoV-2 isolates are highly similar and showed more than 99 percent sequence identity. Poly-protein, surface glycoprotein, membrane glycoprotein and nucleocapsid phosphoprotein are encoded within its 10 coding genome sequences. [11]

Fig. 1. Genomic organization of severe acute respiratory syndrome-coronavirus. ORF, open reading frame. [12]



Previously a connection between Pteropus medius bats and Nipah virus was found in India. Recently emerged severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) also suspected a coherence with bats. [13] To assess the presence of CoVs in bats; the ICMR (Indian Council of Medical Research)-National Institute of Virology (ICMR-NIV) has carried out extensive data collection from bats, which may provide critical insights for the ongoing spillover event. Pteropus spp. bats specimens were collected from Himachal Pradesh, Punjab, Gujarat, Odisha, Karnataka, Kerala, Tamil Nadu, Telangana and Puducherry. Whereas Rousettus spp. bats from Punjab, Gujarat, Odisha, Karnataka, Kerala and Telangana States.[14]
Although there are some humors around the world that this virus is created artificially in labs, but the results of genomic data analysis refuses this theory. However the documented facts so far related to transmission pathways and intermediate host(s) were again raised this conspiracy theory.

CHRONOLOGY OF SPREADING

SARS-CoV-2 contamination is conveyed overwhelmingly through the respiratory tract by tiny beads and by surface contact with morbid matters. [15] Transmission of disease to medical care professionals may occur during airborne producing occasions, for example, intubation, ventilation, pull and nebulization in intensive care units. [16-17] Gastrointestinal tract (GIT) of transmission is likewise conjectured as infection shedding, which has been accounted for in fecal and pee tests, particularly in youngsters, yet needs further validation.[18] Transmission to children from tainted mothers is known, nevertheless adequate information for vertical transmission is not yet reported. [19-20]
The hatching time of COVID-19 is 1-14 days (mean length of 5-7 days). Still, an asymptomatic transporter was identified for and the brooding period was 19 days, proposing the convoluted test to contain the eruption of infection [21-22] whereas the middle hatching period was 3.0 days (range 0-24 days) in an clinical examination on 1,324 cases. [23]
COVID can be identified in the upper respiratory route 1-2 days before beginning of indications and continues in the respiratory tract for 7-12 days in moderate cases and as long as about fourteen days in severe cases. [24] Prolonged presence of the virus has been seen in a couple of youngsters with gentle contaminations, as long as 22 days in the respiratory route and somewhere in the range of fortnight and a month in the fecal examples. [25]

The brooding period for COVID-19 remains practically identical to other ongoing scourge viral sicknesses - SARS (2-7 days) [26] and MERS-CoV (2-14 days) [27], yet it is somewhat more than pig influenza (1-4 days) [28] and occasional flu (1-4 days). [29]

The initial three SARS-CoV-2 cases were accounted for from Kerala in January, 2020. [30] Later during March 2020, cases were likewise announced from Italian vacationers (n=15) and their contacts in New Delhi, India. All the while, cases were accounted in Agra, Uttar Pradesh, which was the result of close contact of a contaminated Delhi-based person who got back from Italy. The viral genome groupings recovered from the clinical examples and their extracts had 99.98 percent character with the SARS-CoV-2 segregate Wuhan-Hu-1[31]

SYMPTOMS

The most common symptoms of the onset of this disease are fever (91%), dry cough (71%), fatigue (57%), myalgia (44%) and dyspnoea (36%). [32-34] other symptoms include headache, nasal congestion, sore throat, diarrhea, nausea, dizziness and vomiting, which have low frequency. [35,36] Apart from the above symptoms in patients with severe diseases, there are more chances of other symptoms like pharyngeal pain, indigestion, abdominal pain, anorexia. Generally high blood pressure, diabetes, cardiovascular disease and cerebro-vascular disease are seen in the elderly, this type of disease is more likely to have adverse consequences. [38, 39]

Pneumonia has also been confirmed in some observations but it is in the minority. [40] In some infants, axial hypotonia, moaning sounds and drowsiness or both, without respiratory manifestations such as neurologic symptoms have also been reported in some cases. [41-42]

Brief information about the signs indicating the need for urgent care is given in the table 1.

Symptoms (frequency in %)	Warning signs (needs hospitalization)
Fever (85)	Fever and upper respiratory symptoms lasting for >5 days
Cough (70)	Breathlessness/respiratory rate >24/min
Breathlessness (32)	Oxygen saturation (SpO2) <95% in room air
Fatigue (38)	Fatigue with heart rate of >110/bpm
Body ache/joint pain (15)	Systolic blood pressure <90 mmHg
Sore throat (13)	
Headache (10)	
Chills (12)	
Body ache/joint pain (15)	
Running nose (5)	
Nausea/vomiting (5)	
Diarrhoea (6)	

Table 1: Symptoms and warning signs [43-45]

SUSCEPTIBILITY

COVID-19 is impossible to miss in its unbalanced case casualty rates among patients. On July 08, 2020, the Indian Ministry of Health and Family Welfare gave a public statement depicting the conveyance of COVID-19 fatality rate over more than six syndicates of 15-yr age sections: 0-14:1%, 15-29: 3%, 30-44: 11%, 45-59: 32 %, 60-74: 39% and 75+: 14%. The most elevated death rates were seen among 60- 74 age group at 39 percent. These outcomes were brought out in one clinical examination directed in India including 7191 patient records. [46] While patients with no earlier comorbid conditions had a low case casualty rate.

Margin in the case fatality rate (CFR) among males (3.3%) and females (2.9%) are likewise seen in India. [47] Mortality rate is prominently higher among those with explicit basic comorbidities, making these populace at high-danger and more defenseless against extreme COVID-19. Tobacco smoking is perceived to build the vulnerability to contamination in a multifactorial manner. A clinical assessment of 1,099 COVID-19 patients, indicated that 32% of patients with a background marked by smoking (smokers and ex-smokers) at the time of hospitalization had a serious type of COVID-19 pneumonia, contrasted with 15% of never smokers. Also, 16% of smokers required hospitalization with intensive care facility contrasted with 5% of never smokers. [48] Such high-hazard gatherings and age-wise case casualty rates in India are portrayed in Table 2 and 3.

Age(year)	Case fatality rate (%)
<40	1
40-60	2.4
>60	14

Table 2: Age and mortality rate ratio [47]

Chronic illness	Case fatality rate (%)
Hypertension	42.5
Diabetes mellitus	39.7
Tuberculosis	20.5
Chronic respiratory disease	16.4
CAD/CKD	13.7

Table 3: Chronic ailments associated with death rate based on a retrospective clinical study [49]
CAD: Coronary Artery Disease; CKD: Chronic Kidney Disease

DIAGNOSTIC TOOLS AND FINDINGS

The WHO suggests the real-time reverse transcription-polymerase chain reaction (qRTPCR) demonstrative board for the identification of COVID 19 cases, [50] a procedure that India has likewise embraced.

Accessories, which are needed to conduct the test incorporate viral vehicle medium (with two swabs), RNA extraction units and testing packs for manual qRTPCR (blend units), computerized qRT-PCR units and stages along with testing units. [51]

Other analytic tests for diagnosis are as followed:-

Serological test is particularly valuable in retrospective distinguishing proof of asymptomatic cases, and to recognize and screen people recuperated from COVID-19 disease whose antibodies may serve to treat patients through improving plasma treatment. [52-53]

Ultrasonogram is ultrasonography of lungs in distinguishing COVID-19 pneumonia. Since, its convenience needs further investigation. [54]

Chest X-ray and CT scan outcomes of COVID-19 patients are lung solidification and ground-glass opacities. Coronavirus and other viral pneumonias by and large show aspiratory opacities in more than one projection. [55-56]. Chest X-rays/imaging are regularly unusual even in early infection and uncover reciprocal, fringe and not well characterized interstitial invades with ground-glass opacification or lobular and sub-segmental union. [55]

Deviation in diagnostic standard values may give understanding into the pre-test confirmation of COVID-19.

Parameters	Inference
CBC	↓**Lymphocytes**
Creatinine	↑
AST/ALT/bilirubin	↑
CRP, LDH, ferritin	↑
CXR: Interstitial infiltrates/ARDS	

Table 4: List of common laboratory abnormalities associated with COVID-19 infection.
AST: aspartate aminotransferase; ALT: alanine aminotransferase; LDH: lactate dehydrogenase; CRP: C-reactive protein; ARDS: acute respiratory distress syndrome; CXR: chest X-rays; CBC: complete blood count. [56-58]

Raman, FT-IR ATR (attenuated total reflectance) and vibrational spectroscopy are arising techniques that permit ongoing, noninvasive and non-ruinous investigation of bio-liquids and natural tissues. [59] It is because of the conveniences and low-commotion estimations gave by these techniques, it very well may be broadly utilized for practical mass screening of COVID-19 at medical clinics, centers, air terminals, among different spots. Once, these methods are applied in a huge scope, the expenses can be diminished and reached out to low-asset settings, as the least sample handling can keep operational costs low. [60]

Clinical Stages:-

During the pandemic time frame, when a patient presents to the hospital with fever, hack or windedness, an elevated level of doubt for COVID-19 disease must be engaged. The doctor must save a watch for the notice signs and start early resuscitative and strong measures if these are distinguished.

Degree of COVID19	Manifestation	Level of care
Mild	Fever with upper respiratory indications Gentle sore throat and GI manifestations. Testing might be considered in select people in the high danger group	Home care
Moderate	respiratory rate >24/min Oxygen immersion (SpO2) <95% in room air Weakness with pulse of >110/bpm Systolic circulatory strain <90 mmHg	In patient care
Severe	SpO2 <90% in room air Hypotension requiring ionotropic uphold ARDS/myocarditis	Intensive care

Table 5: The degree of care dependent on the basis of severity[61-64]

ETHICAL ENGAGEMENT

COVID-19 pandemic has caused uncommon human wellbeing and financial outcomes. In the previous decade, India has seen a few epidemics for instance H1N1, H5N1, avian flu, Ebola, SARS, Zika and Nipah; which were effectively handled with fitting medical facilities. [65]

COVID-19 pandemic is driving home their refutable proof that relief of the pandemic warrants prompt use of proof based non-pharmaceutical interventions (NPIs) through an empowered and instructed network. [66] This is especially relevant with regards to the progressing pandemic because of the fast transmission of SARS-CoV-2 and non-accessibility of the particular antiviral medication and vaccines.

Morals readiness is a significant component of plan for managing general wellbeing crises or outbreaks in light of the fact that it assists with guaranteeing best guidelines and nature of expectations with no trade off on human security and the moral qualities. Accessibility of prepared medical staff with solid psychosocial uphold, research-empowered climate, great morals perception, earlier community needs evaluation and conceivable reception to the current necessities are measures that can assist with creating mediations that are authentic and comply the standard with the worldwide guidelines. [67-68]The preparedness additionally encourages the public authority to start prompt reaction and satisfy the desires from people in general and build their certainty and trust.

PREVENTIVE MEASURES

In this current fetal circumstance brought about by the extreme intense respiratory infectious condition COVID-19, it is not amazing that there has been a colossal ascent in the buy and utilization of disinfectants. The infection spreads by human-to-human communications and through tainted surfaces, for example, metal, glass, and plastic, this virus can get by from a few hours as long as 9 days [69-70], featuring the need to purify surfaces viably.

Thus, there is a wide scope of promoted disinfectants, for example, bleach powder, alcoholic products, and hand sanitizers that can be utilized to forestall and control the spread of the infection. [71] Although disinfectants can be potent, whenever abused, they can be unsafe to people just and to the surroundings.

Chemical	Concentration (%)	Application	Effects on prolong exposure	Risk of poisoning
Sodium hypochlorite	5.25-6.15	Surfaces	Ocular irritation and gastric burns. Chemical burns to respiratory track. Mild to severe irritation of the skin and mucous membranes. Skin irritation, scales, and scabs.	62.1 %
Hypochlorous acid	0.017- 0.046	Surfaces		
Glycolic acid	11.185	Surfaces		
Peroxyacetic acid	2.38- 15	Surfaces		
Quaternary Ammonium compounds (quats)	0.05- 0.2	Surfaces		
Octanoic acid	0.099- 3.05	Surfaces		
L-lactic acid	0.19- 1.77	Surfaces	Eye and skin irritation and burn	36.7 %
Citric acid	2.5- 4.9	Surfaces		
Hydrogen peroxide	0.39- 27.5	Surfaces		
Ethanol	60- 80	Surfaces	Irritation of the respiratory tract and effects on the central nervous system	
Ethanol	60- 95	Body part		
Benzalkonium chloride	Less than 0.12	Body part	Skin irritation on prolonged exposure	

Table 6: Some of the most widely used natural and synthetic surface and hand disinfectants approved by the Environmental Protection Agency for the prevention of SARS-CoV-2. [72-73]

Utilization of hand sanitizers, however, should be restricted, as they can bring about the danger of contamination by disturbing the typical flora and bothering the skin, which ordinarily goes about as a hindrance to pathogenic agents. On account of hand purification, nonirritating cleansing soaps and liquor based hand sanitizers ought to be utilized rather than cleansers and hand sanitizers containing benzalkonium chloride, which can fuel skin harm and stimuli. [74-75]

An herbal constituent as of late added to the Environmental Protection Agency's rundown is thymol [76], a characteristic phenolic moiety acquired from Thymus vulgaris L. It is a broadly utilized ancient medication in the treatment of assortment of infections, for example, gastro-enteric and broncho-aspiratory messes. The essential oil of thyme and the compound thymol have antimicrobial effect in vitro against *E. coli* strains. The fundamental oil of thyme has been found to have the most grounded antimicrobial properties. [77-80]

Such elective measures can incorporate the utilization of less harmful synthetic disinfectants, for example, substances of natural origin, which incorporate ethanol, and hydrogen peroxide, to restrict hazardous consequences to human and the climate.

UV illumination is a typical technique for inactivation of pathogenic microorganisms. The component of UV inactivation relies upon the UV frequency/s utilized [81] and for certain microbes, UV sources with different emanation peaks (for example medium pressure lights) have found to bring about more successful inactivation, by actuating various damage systems [82]. It is found as compelling purification approach for some human and animal infections, including COVID-19 [83].

UV light-emanating diodes (UV LEDs) are an arising UV hotspot for purification. [84] UV-LEDs take into consideration adaptability of configuration because of their tiny size and control of radiation designs, have short turn-on schedule, and require low voltage (and subsequently can be worked by a battery or a sunlight based board). [85]

Yoram Gerchma *et al* showed that UV-LED with top outflow at ~286 nm could offer productive inactivation of numerous infections, including the COVID family. [86]

Christiane Silke Heilingloh *et al* showed that total virus inactivation was accomplished following a nine minute introduction to UVC and a produced UVC dose of 1048 mJ/cm2. This information affirm revealed discoveries that UVC is more compelling in inactivating viruses, and feature the intense light as a successful technique for the inactivation of SARS-CoV-2. [87]

In an examination, UVC inactivation energy and fatal dose for COVID-19 was discovered to be within a second; UVC light had the ability to inactivate more than 99 % of SARS-CoV-2 viral particles. Indeed, LD90 and LD99.999 were accomplished at 0.016 and 108.714 mJ/cm2 (0.01 and 49.42 s) individually. [88]

Such strategies are dependable not just for sterilization purposes in medical care system yet in addition for planning inactivated COVID-19 material for vaccine development research.

THERAPEUTICS

There is no particular treatment endorsed for COVID-19. Clinical preliminaries are in pipe- line. As of now, approved antiviral drugs are employed as adjunctive in nature. [89]

The accompanying medications have indicated some guarantee for the treatment of COVID-19 remdesivir, ritonavir-lopinavir combination, vitamin C infusion, darunavir and cobicistat, hydroxychloroquine, umifenovir. [90-92]

First COVID-19 vaccine is supposed to get approval at the end of 2020 or early 2021. Moreover, manyCOVID-19 vaccines are at present in stage 3 clinical preliminaries with viability validated as prevention of affirmed cases. [93] WHO suggests that effective vaccine should show about 50 %inclination in occurrence of disease, with 95% CI (confidence intervals). [94]

In the current climate, some vaccine developers have shown willingness to start or progress later phase trial preparations even before definitive results of earlier phase trials are available [95]. Notwithstanding endeavors in optimizing vaccine advancement, the requirement for established general wellbeing procedures, such as physical distancing, early diagnosis, self-seclusion and outbreak control stay as significant moderation instruments.

CONCLUSION

The quantity of worldwide epicenters of SARS-CoV-2 is exponentially increasing day by day, particularly in underdeveloped countries. Genomic, virological and clinical investigations are advancing at an exceptional speed. Such examinations are relied upon to add a comprehensive study of disease transmission, pathogenesis, therapy and prevention. The definition of a presumed case is required to be reconsidered on daily basis, so clinical staff and epidemiologists should keep themselves updated for better control of the pandemic. Additionally, they are likewise firmly encouraged to utilize defensive measures since they reside among infected populace because of nosocomial introduction. The infection's

clinical signs shift generally; patients with mild or asymptomatic sickness may not look for clinical consideration, so their infection may stay undetected, accordingly aggravating transmission. The specific route of SARS-CoV-2 pathogenesis and transmission and the dynamic of the pandemic are under extreme examination. At this moment, traditional heath measures and control approaches are the best way to battle the COVID-19 pandemic.

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