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The Out Break of Coronavirus (COVID-19)

Dr. Yeshwanth Sankranthi[1], Dr. R Bhanu Prasad[2]
[1] Department of Clinical Research, Clinical Research Assistant, Boston Medical School, Bostan, Massachusetts, United States of America
[2] Department of Clinical Operations, Clinical Research Associate, Clinwave Research Private Limited, Hyderabad, Telangana, India

Abstract
The chronicle the facts about epidemiological, Clinical effects, Characteristics, Mode of transmission, Physiology, Treatment, Preventive care and prospectives of further research to be carried out to decimate the novel virus.

Keywords: coronavirus, coronaviridae, betacoronaviruses, covid-19, severe acute respiratory syndrome (SARS), middle east respiratory syndrome (MERS)

Introduction
Coronaviruses are enveloped as a non-segmented positive sense RNA viruses belonging to the family Coronaviridae and the Order Nidovirales and broadly distributed in humans and other mammals [3]. Currently estimates of the incubation period of the virus range from 2-10 days.By now you have probably heard of COVID-19 Discovered in 2019, which is responsible for global pandemic. As far the main country affected has been China, but it has spread to number of other countries around the world to a varying degree. The virus initially referred as 2019-nCoV and familiarly called "Wuhan coronavirus".

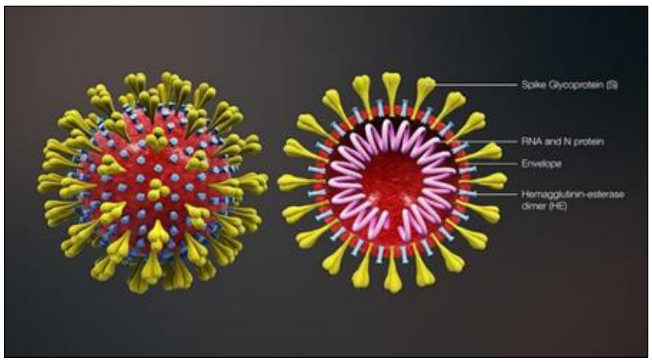

Fig 1

World health organization named it as COVID-19 because it doesn't refer to any geographical area, an animal, a person, or group people all of which can lead to stigma. The virus officially named as SARS CoV-2, which is genetically very similar to SARS Coronavirus.
Coronaviruses are a large family of viruses that usually cause mild to moderate upper-respiratory tract illnesses namely common cold and respiratory distress. However, three times in the 21st century coronavirus outbreaks have arisen from animal reservoirs, now the present virus epidemic from Wuhan city, china.
Most of the virus circulate among animals including pigs, camels, bats and cats. Rarely, animal coronaviruses that infect animals have emerged to infect people and can spread between people. Viruses jump to humans called a spillover event.

Types of Coronaviruses
Coronaviruses have been stratified into three serious outcomes in people:
1. SARS (severe acute respiratory syndrome) which emerged in late 2002 and disappeared by 2004. SARS coronavirus that bounded over from bats to civets and then over to humans
2. MERS (Middle East respiratory syndrome), which emerged in 2012 and remains in circulation in camels. MERS corona virus hooped over from bats to camels and then over to humans
3. COVID-19, which emerged in December 2019 from China and a global effort is under way to contain its spread. This virus most likely started with bats but that enter to intermediate host was probably a pangolin, based on fact that scientific evidence, identified that 96% genetic match between coronavirus in pangolins and SARS-COV-2 virus.

Epidemiology
- Present statistics globally confirmed 88,948 number of cases among which 1804 are new.
- In China 80 174 confirmed (206 new) 2915 deaths (42 new).
- Outside of China 8774 confirmed (1598 new)
- This virus spread to 64 countries.
- SARS in 2002 reported in 8,098 people and 774 deaths fatality rate of 9.6%
- MERS in 2012 reported 2,494 cases and 858 deaths, fatality rate of a 34%
- SARS CoV-2 Global Death Rate Is 3.4% till date.

Seasonal effect on COVID -19
Coronavirus respiratory infections occur primarily in the winter, although smaller peaks are sometimes seen in the fall or spring, and infections can occur at any time of the year, outbreaks at almost any time of year but mostly in the spring and fall.

Temperature effect on COVID- 19

Every 1°C increase in the minimum temperature led to a decrease of the cumulative number of cases by 0.86%. The study found that, to certain extent, temperature could significant change COVID-19 transmission and It is suggested that countries and regions with a lower temperature in the world adopt the strictest control measures to prevent future reversal [1].

Viral composition

Coronaviruses are medium-sized enveloped positive-stranded RNA viruses, they have the largest known viral RNA genomes, with a length of 27 to 32 kb. The host-derived membrane is studded with glycoprotein spikes and surrounds the genome, which is encased in a nucleocapsid that is helical in its relaxed form but assumes a roughly spherical shape in the virus particle.

Routes of transmission

Coronaviruses probably spread via direct contact with infected secretions or large aerosol droplets, if these droplets land on other person mouth, nose or eyes and allows virus to enter a new person. It can also transmit via fecal-oral, or body fluid routes.

It has been transmitted from one apartment to another within resident building through drainage system, it is seen in SARS epidemic.

Pathophysiology

Once the virus enters into human body, viral structures, glycoprotein spikes allow virus to invade the cells lining the respiratory track and lungs, after binding the coronavirus enters and takes the cellular machinery DNA to make more copies of virus, so it can spread to surrounding cells and the mucus.

Histology and physiology

Histological examination showed bilateral diffuse alveolar damage with cellular fibro myxoid exudates. Lung tissue also displayed cellular and fibro myxoid exudation, desquamation of pneumocytes and pulmonary edema. Interstitial mononuclear inflammatory infiltrates, dominated by lymphocytes, in lungs. Multinucleated syncytial cells with atypical enlarged pneumocytes characterized by large nuclei, amphophilic granular cytoplasm, and prominent nucleoli were identified in the interalveolar spaces, showing viral cytopathic-like changes. No obvious intranuclear or intracytoplasmic viral inclusions were identified. The lung showed evident desquamation of pneumocytes and hyaline membrane formation, indicating acute respiratory distress syndrome (ARDS), It leads to septic shock and death.

Fatality rate high among people with infection in those over age of 60, smokers and previous medical conditions like hypertension.

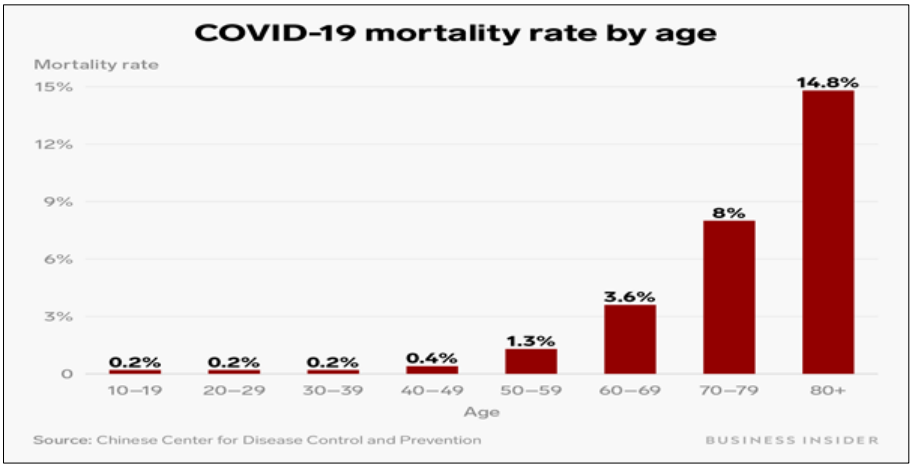

Fig 2

Symptoms

- fever
- Cough
- Shortness of breath
- Pneumonia

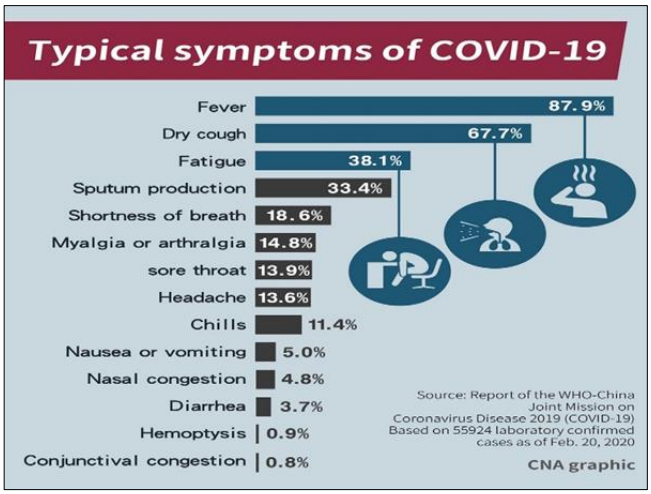

Fig 3

Incubation period
Incubation period is 2-14 days, it varies from person to person up to 24 days. Asymptomatic people have low levels of circulating the virus, but they play minor role in overall epidemic.

Spreading
Spreading measure with R_o
R_o=1 means that infected person passes it on to 1 new person
In case of COVID-19 disease SARS-CoV R_o is 2-2.5

Diagnosis
This virus is diagnosed through nasopharyngeal samples on reverse-transcriptase polymerase chain reaction (RT-PCR) and immunofluorescence antigen detection assays.

Prevention
There is no vaccine to prevent disease. The best way to prevent illness is to avoid being exposed to this virus.
- Avoid close contact with people who are sick.
- Avoid touching your eyes, nose, and mouth.
- Stay home when you are sick.
- Cover your cough or sneeze with a tissue, then throw the tissue in the trash.

Treatment
Supportive care
- Providing fluids
- Oxygen
- Ventilator support for ill patients

Pharmacological Treatment
No vaccine to protect against COVID-19 and no medications approved to treat it.
Based on some previous study data following medicine possibly effective against SARS CoV-2
- Chloroquine
- Ritonavir
- Remdesivir

First clinical trial on COVID- 19
To evaluate the safety and efficacy of the Investigational Antiviral Remdesivir, a Randomized Controlled Clinical trial was initiated in the hospitalized adults diagnosed with Coronavirus disease 2019 (COVID-19). The trials regulatory sponsor is the National Institute of Allergy and Infectious Diseases (NIAID), part of the National Institutes of Health [2]. Being an investigational broad-spectrum Antiviral, Remdesivir was previously tested in humans with Ebola virus disease and has shown a promised effect in animal models for treatment of MERS and SARS which are caused by other strains Corona viruses.
Participants in the treatment group will receive 200 milligrams (mg) of Remdesivir intravenously on the first day of enrollment to the study followed by a 100 mg each day for the duration of hospitalization up to a total of 10 days. Check whether if this drug increased Clinical Benefit compared to placebo. During the trial, samples are collected from the nose and throat swabs approximately for every two days. Researchers will examine these specimens along with indicators such as temperature, blood pressure and use of supplemental oxygen for SARS-CoV-2 and the clinical outcomes are measured and assessed.
That considers factors such as.

Further research
NIAID (National Institute of Allergy and Infectious Diseases) research has improved fundamental understanding of coronaviruses and provides a strong foundation to address the challenge of SARS-CoV-2, the novel coronavirus that causes COVID-19. NIAID has responded to the newly emerging COVID-19 outbreak by expanding range of basic research on coronaviruses. NIAID scientists have rapidly identified the human receptor used by SARS-CoV-2 to enter human cells.
In addition, NIAID investigators and their collaborators recently identified the atomic structure of the spike protein, an important SARS-CoV-2 surface protein that is a key target for the development of vaccines and therapeutics, and also evaluating the stability of SARS-CoV-2 outside the human body for better understanding the potential cause for viral spread throughout the community.

Prospects
More cases of COVID-19 are likely to be identified in the coming days. It is also likely that person-to-person spread will continue to occur, including in communities and some point, widespread transmission of COVID-19 globally.
Widespread transmission of COVID-19 would translate into large numbers of people needing medical care at the same time. Public health and healthcare systems may become overloaded, with elevated rates of hospitalizations and deaths. Other critical infrastructure, such as law enforcement, emergency medical services, and transportation industry may also be affected, and food shortage will occur. Economy may highly effected.

Questions for further research
- Why does COVID-19 Seems like such a scarier pandemic then anything before?
- Why global economy crashing under the impact of COVID-19?
- Don't you think social media in amplifying news?

Let's take precautions and be careful but not panic

Conclusion
We hope our study will inform the global community of the emergence of this Novel Coronavirus and its Clinical features to enhance the Quality of Life by conducting Pragmatic Research.

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