INTRODUCTION

Coronaviruses are a group of RNA viruses that can cause diseases both in mammals and birds. When infected in humans, these viruses are reported to cause respiratory tract infections that range from mild to lethal. Mild illnesses included the familiar cases of the common cold (predominantly caused by the rhinoviruses), while more lethal illness like SARS (Severe acute respiratory syndrome coronavirus), MERS (Middle East respiratory syndrome-related coronavirus), and COVID-19 are also reported. Coronaviruses are found to vary significantly in the risk factor. Some variants can kill more than 30% of the infected population, like MERS-CoV, while some are relatively harmless, such as the common cold.[1] Coronaviruses cause colds with major symptoms, like fever, sore throat, swollen adenoids, pneumonia and bronchitis. Review on medical literature takes us to the history and origin of the very first occurrence of corona virus case to 1960’s when it was reported as cold. According to a Canadian study done in 2001, approximately 500 patients were identified with flu like symptoms. From tests done based on polymerase chain it was confirmed as those were infected with corona virus strain. The human coronavirus discovered in 2003, SARS-CoV, caused severe acute respiratory syndrome (SARS), and had a unique pathogenesis as it caused both upper and lower respiratory tract infections. Coronaviruses were included in the subfamily Orthocoronavirinae, of the family Coronaviridae, order Nidovirales, and realm Riboviria. The name "coronavirus" is derived from the Latin term corona, meaning "crown" or "wreath". The name was coined by biologists June Almeida and David Tyrrell who first observed human coronaviruses.[1,2]

Human coronaviruses of six species are known till date. Among these one species was further subdivided into two different strains, making seven strains of human coronaviruses. Among the said species, Four human coronaviruses produce symptoms that are generally mild. This included Human coronavirus OC43 (HCoV-OC43) [β-CoV], Human coronavirus HKU1 (HCoV-HKU1) [β-CoV], Human coronavirus 229E (HCoV-229E) [α-CoV], Human coronavirus NL63 (HCoV-NL63) [α-CoV]. Whereas three human coronaviruses showed symptoms that are potentially severe. They were Middle East respiratory syndrome-related coronavirus (MERS-CoV) [β-CoV], Severe acute respiratory

*Corresponding author: Ayisha Reeha
Vth Year Pharm D, College of Pharmaceutical Sciences, Government Medical College, Kannur, Kerala, India
syndrome coronavirus (SARS-CoV) [β-CoV], Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) [β-CoV]. The human coronaviruses variants HCoV-OC43, HCoV-HKU1, HCoV-229E, and HCoV-NL63 were quite common among the human population and caused the common cold in adults and children worldwide with minor symptoms. These constituted to about 15% of common colds, while 40 to 50% of colds were caused by the rhinoviruses.

Severe acute respiratory syndrome (SARS)

In 2003, there was a outbreak of severe acute respiratory syndrome (SARS) in Asia, and followed elsewhere in the world. Thus, World Health Organization issued a press release declaring that a coronavirus of novel nature was identified. The virus was officially named the SARS coronavirus (SARS-CoV). In that outbreak more than 8,000 people were infected around the globe and among them about ten percent died.

Middle East respiratory syndrome (MERS)

A new type of coronavirus was identified, called Novel Coronavirus 2012 in September 2012. Later it was officially named Middle East respiratory syndrome coronavirus (MERS-CoV). Single cases were reported in Saudi Arabia, France and Qatar. Sporadic cases, small cluster cases, and large outbreaks were reported in 24 countries, with almost over 1,000 cases of the virus. There were over 400 deaths, up to 2015. As per latest reports available as on December 2019, about 2,500 cases of MERS-CoV infection had been confirmed with a mortality rate of approximately 35%. [2,3,4]

In 2004, World Health Organization and Center for Disease Control and Prevention (CDC) declared corona case to be a “state emergency”. This was in response to the emergence of severe acute respiratory syndrome (SARS). The government of United States established a national surveillance programme on corona suspected cases incorporating clinical, epidemiologic, and laboratory criteria. As a result of this, 1,460 unexplained respiratory illnesses were reported by state and local health departments to the Center for Disease Control and Prevention from 17th March to 30th July 2003. Among these, 398 (27%) cases met clinical and epidemiologic SARS case criteria. Of these, 72 (18%) cases had radiographic evidence of pneumonia. And eight (2%) were of laboratory confirmed SARS-coronavirus. It was also observed that 206 (52%) were SARS-CoV negative and 184 (46%) were with undetermined SARS-CoV status because of missing convalescent-phase serum specimens. Thirty-one percent (124/398) of cases ended up with patients hospitalized. But it was not fatal and none died.

Travel was the most common epidemiologic link to occurrence of SARS-coronavirus with clear evidence of 329 cases with travel history among the 398, constituting about 83%. Reports showed that Mainland China was the affected area most commonly visited by the patients infected. Mainland China was the most frequent destination with 39% of travellers followed by Hong Kong 38% and Toronto 18%. Almost 22% of patients travelled to more than one affected area. Only one case of possible household transmission was reported and absolutely no laboratory-confirmed infections occurred among healthcare workers involved. [1,2]

Another study report of Hong Kong was confirmed 50 patient of severe acute respiratory syndrome while 30 of them were confirmed as corona virus infected. In the year 2012, literatures from Saudi Arabia were presented several infected patient and deaths due to SARS-coronavirus.[3-6]. Nothing medically significant or alarming was observed red in the coming years until 31 Dec 2019.

Coronavirus disease 2019 (COVID-19)

This virus was later renamed SARS-CoV-2 by the International Committee on Taxonomy of Viruses. This strain has been identified as a novel strain of Betacoronavirus from group 2B with an approximate genetic similarity of 70% with that of SARS-CoV

31st December 2019

Wuhan Municipal Health Commission came with a report of a cluster of cases of pneumonia in Wuhan. It was reported to be a novel coronavirus.

1st January 2020

WHO had set up the IMST (Incident Management Support Team) for dealing with the outbreak.

4th January 2020

WHO reported on social media that there was a cluster of pneumonia in Wuhan, China

5th January 2020

WHO published Disease Outbreak News (DON) on the new virus. This is a technical medical publication to the scientific and public health community all over the world and as well as to global media. It contained risk assessment, advice and precautions to be adopted in general to world countries. It also reported on what China had informed WHO about the status of patients among the cluster of pneumonia cases in Wuhan.

13th January 2020

There was a confirmed case of COVID-19 in Thailand, the first of recorded case outside of China.

14th January 2020

WHO, in a press briefing reported that there may be limited human-to-human transmission of the coronavirus in the 41 confirmed cases, mainly through family members, and that there was a risk of a possible wider outbreak. It was also alarmed that human-to-human transmission of SARS would not be surprising given earlier experience with SARS, MERS and other respiratory pathogens that prevailed.

30th January 2020

WHO reported 7818 total confirmed cases worldwide, with majority in China, and only mere 82 cases reported in 18 countries outside China.

11th March 2020

Hugely concerned by the alarming levels of spread and severity, and by the alarming levels of inaction from countries affected, WHO assessed that COVID-19 can be characterized as a pandemic.[7]
The first case of COVID-19 in India was reported on 30 January 2020. As of 11 July 2020, Indian Government through the Welfare has confirmed a total of more than 8 lakh cases. Almost 5 lakh recoveries and 20000 deaths in the country. As of this date, about 21 akh active cases are reported. India currently has the largest number of confirmed cases in Asia and has the third highest number of confirmed cases in the world after the United States and Brazil. India's case fatality rate is relatively lower at 2.80%, against the global 4.7%, as of 6 July. Six cities account for around half of all reported cases in the country. The cities most affected are Mumbai, Delhi, Ahmedabad, Chennai, Pune and Kolkata.

Statistics around the globe on 11th July 2020

<table>
<thead>
<tr>
<th>Location</th>
<th>Confirmed</th>
<th>Casesper1millionpeople</th>
<th>Recovered</th>
<th>Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worldwide</td>
<td>1,24,46,105</td>
<td>1,601</td>
<td>58,28,356</td>
<td>5,58,683</td>
</tr>
<tr>
<td>United States</td>
<td>32,38,219</td>
<td>9,826</td>
<td>9,63,412</td>
<td>3,35,953</td>
</tr>
<tr>
<td>Brazil</td>
<td>18,04,338</td>
<td>8,538</td>
<td>11,85,596</td>
<td>70,524</td>
</tr>
<tr>
<td>India</td>
<td>8,20,916</td>
<td>603</td>
<td>5,15,385</td>
<td>22,123</td>
</tr>
<tr>
<td>Russia</td>
<td>7,13,936</td>
<td>4,865</td>
<td>4,89,068</td>
<td>11,017</td>
</tr>
<tr>
<td>Peru</td>
<td>3,19,646</td>
<td>9,948</td>
<td>2,10,638</td>
<td>11,500</td>
</tr>
<tr>
<td>Chile</td>
<td>3,09,274</td>
<td>16,186</td>
<td>2,78,053</td>
<td>6,781</td>
</tr>
<tr>
<td>Mexico</td>
<td>2,89,174</td>
<td>2,285</td>
<td>1,77,097</td>
<td>34,191</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>2,88,133</td>
<td>4,337</td>
<td>Nodata</td>
<td>44,656</td>
</tr>
<tr>
<td>Spain</td>
<td>2,53,908</td>
<td>5,391</td>
<td>1,50,376</td>
<td>28,406</td>
</tr>
<tr>
<td>Iran</td>
<td>2,52,720</td>
<td>3,033</td>
<td>2,15,015</td>
<td>12,447</td>
</tr>
<tr>
<td>South Africa</td>
<td>2,50,687</td>
<td>4,265</td>
<td>1,18,232</td>
<td>3,860</td>
</tr>
<tr>
<td>Pakistan</td>
<td>2,46,347</td>
<td>1,124</td>
<td>1,53,134</td>
<td>5,123</td>
</tr>
<tr>
<td>Italy</td>
<td>2,42,639</td>
<td>4,028</td>
<td>1,94,273</td>
<td>34,938</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>2,26,486</td>
<td>6,619</td>
<td>1,63,026</td>
<td>2,151</td>
</tr>
<tr>
<td>Turkey</td>
<td>2,10,965</td>
<td>2,537</td>
<td>1,91,883</td>
<td>5,323</td>
</tr>
<tr>
<td>Germany</td>
<td>1,99,584</td>
<td>2,400</td>
<td>1,83,990</td>
<td>9,130</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>1,78,443</td>
<td>1,060</td>
<td>86,406</td>
<td>2,275</td>
</tr>
<tr>
<td>France</td>
<td>1,70,752</td>
<td>2,546</td>
<td>78,388</td>
<td>30,604</td>
</tr>
<tr>
<td>Colombia</td>
<td>1,40,776</td>
<td>2,850</td>
<td>58,800</td>
<td>4,925</td>
</tr>
<tr>
<td>Canada</td>
<td>1,07,126</td>
<td>2,821</td>
<td>70,901</td>
<td>8,759</td>
</tr>
</tbody>
</table>
Many of them patient reported bilateral abnormalities. Coronavirus was isolated from bronchoalveolar lavage fluid and detected in blood samples. Tillnow, coronavirus was not confirmed in other biological fluids like feaces and urine of infected.[16]

**Prevention**

**To prevent the spread of COVID-19**

- Clean your hands often. Clean or sanitize with soap and water, or an alcohol-based hand rub.
- Maintain a distance of 1 metre between yourself and others.
- Maintain a safe distance from anyone who is sick coughing or sneezing.
- Wear a mask and exercise physical distancing.
- You should not touch eyes, nose or mouth.
- Cover your nose and mouth with your bent elbow or a tissue whenever you want to cough or sneeze.
- Stay home if you feel unwell or going out is not required.
- If you are having a fever or cough or difficulty breathing, seek medical attention.
- Avoid going to markets and are as where live or dead animals are handled.
- Avoid contact with animals, their excretions or droppings.[17,18,19,20]

**Management and Vaccination**

The treatment guidelines practised for COVID-19 may differ between countries. As far as WHO guidelines are concerned, they are very general, recommending management of symptoms and advise special caution for paediatric patients, pregnant women and patients with underlying co-morbidities. The recommendation are to provide supportive management for each patient's need like antipyretics for fever, oxygen therapy for those with respiratory distress. WHO recommends that severe cases should be provided with empiric antimicrobial therapy and mechanical ventilation depending on the individual patient's clinical conditions. Still treatment protocols across various countries are similar which include hydroxychloroquine, chloroquine phosphate, remedesivir, lopinavir, ritonavir etc. [21]

**Management of Mild Cases**

- Should be isolated to break the chain of transmission.
- Managed at Covid Care Centre, First Referral Units (FRUs) and Community Health Centre (CHC), sub-district and district hospitals or at home.
- Daily follow up for temperature, vitals and Oxygen saturation.
- May be given symptomatic treatment with antipyretic like Paracetamol for fever and pain, adequate nutrition and appropriate rehydration.

**Clinical Management of Moderate cases**

- Oxygen Support:
- Tab. Hydroxychloroquine (400mg) BD on 1st day followed by 200mg 1 BD for 4 days. (after ECG Assessment)

---

**India's fight against COVID-19**

On 22 March, India observed 14-hour voluntary public janatha curfew few after the Primeminister called for it. It was then followed by mandatory lockdowns in COVID-19 hotspots of all major cities. Going further, on 24th March, the Prime Minister ordered anation wide lockdown for a period of 21 days. On 14th April, since situations did not improve, the PM extended the nation wide lockdown till 3rd May. This was was followed by two week period extensions on 3rd and 17th May with relaxations compared to the start of lockdown. Duet reports of lockdown being affecting national GDP and due to reports of world wide lifting off lockdown, beginning 1st June, Indian Government also start dun locking the country except for containment zone. This unlocking is planned in three phases.

Unlock 1.0 phase started from 1 to 30 June and the second phase of un lock, Unlock 2.0, was announced for the period of 1 to 31 July, with more easein restrictions.

**MICROBIOLOGY**

Coronavirus is reported to be a spherical or pleomorphic, single stranded, enveloped RNA and covered with glycoprotein. Four subtypes of coronaviruses such as alpha, beta, gamma and delta coronavirus can identified. Each of sub type coronaviruses has many serotypes [9,10,11,12]

**Mode of Spreading**

Peoples can get the infection through close contact with an infected person. Spread can also occur through cough and sneezing. Coronavirus was reported to be spread via airborne zoonotic droplets. Virus possibly replicated in ciliated epithelium and cause cellular damage and infection. According to a study of 2019, Angiotensin converting enzyme 2, a membrane exopeptidase in the receptor used by coronavirus in entry to human cells.[13,14,15]

**Symptoms**

According to a report published on 24 Jan 2020, coronavirus infected patient have many common features such as fever, cough, fatigue, diarrhea, dyspnea and other flu like symptoms.

### Table: COVID-19 Cases in Various Countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Confirmed</th>
<th>Deaths</th>
<th>Recovered</th>
<th>Active</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qatar</td>
<td>1,02,630</td>
<td></td>
<td>37,357</td>
<td>98,233</td>
</tr>
<tr>
<td>Argentina</td>
<td>94,047</td>
<td>2,093</td>
<td>38,971</td>
<td>1,774</td>
</tr>
<tr>
<td>Mainland China</td>
<td>85,445</td>
<td>61</td>
<td>Nodata</td>
<td>Nodata</td>
</tr>
</tbody>
</table>
• IV methylprednisolone 0.5 to 1 mg/kg for 3 days (preferably within 48 hours of admission or if oxygen requirement is increasing and if inflammatory markers are increased)
• If patients experience a secondary bacterial infection. Consider empiric antibiotic therapy.
• Provision of mechanisms for follow up and transportation to Dedicated Covid Hospital should be available. [16]

Clinical Management of Severe Cases
• Oxygen Support

Specific guidelines are given for the following severities
• Management of hypoxemic respiratory failure and ARDS
• High – Flow Nasal Cannula oxygenation (HFNO) or non – invasive mechanical ventilation:
• Management of septic shock

Other therapeutic measures
• Methylprednisolone 1 – 2mg/kg/day.

Investigational Therapies
• Remdesivir
• Convalescent plasma (Off Label)
• Tocilizumab (Off Label) [21]

Impact of COVID-19
Spread of COVID-19 has left with huge impact on all major countries. We can say blindly that there are no social area left out where COVID-19 has not left an impact. Much review is needed on each area and to evaluate the depth of impact. The major areas that are hit with COVID-19 are;
• Commercial establishments
• Education
• Economy and GDP
• Unemployment
• Entertainment industry
• Events and Event management
• Toursims
• Religion
• Sports
• Transport
• Confusion created that lead to exodus of migrant workers
• Food security [22]

CONCLUSION
SARS, a beta coronavirus that emerged in 2002 was controlled effectively by taking aggressive public health measures. As a result, there have been no new cases reported since year 2004. Then MERS emerged in 2012, and infected people but still everything was under control. COVID-19, the latest and the novel version of corona virus and sometimes the deadliest of the corona strains is believed to have originated in a live animal market in Wuhan, China. It has spread rapidly throughout that country and the world. Health officials around the world are working in tandem to contain the spread of this deadly virus through various public health measures like social distancing, contact tracing, testing, quarantine, lockdown and travel restrictions. Scientists are putting their best efforts to develop a vaccine and to find medications to treat this disease. All these health measures and efforts will hopefully blunt the spread of the virus. A thorough study to understand the corona virus host immune pathological response, viral replication and pathogenesis will significantly improve our ability to design vaccines and reduce disease burden. Until adequate management and treatment strategy evolves out ‘Distance is the only rescue’.

References


How to cite this article:
DOI: http://dx.doi.org/10.24327/ijrsr.2020.1107.5449

******