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A REVIEW ON GLOBAL THREAT CORONA VIRUS DISEASE: COVID-19

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ABSTRACT
Corona virus disease is a kind of viral disease caused by Severe Acute Respiratory Syndrome- CoV 2, which is first witnessed in Wuhan city, China and it can be transmit from human to human. Coronavirus size ranges from (65-125 nm) in diameter and contain a single stranded RNA as nucleic acid material, size ranging from 26 to 32 kbps in length. The sub group of coronaviruses family is Alpha (α) Beta (β) Gama (γ) and delta (δ) coronavirus. Coronavirus disease is a kind of respiratory disease which mainly affects the lower respiratory tract of human body. Initially interferon α normalisation, broad spectrum antibiotic and antiviral drugs was used to reduce the viral load. There may be different kind of mode of transmission of this virus for example Respiratory transmission, Aerosol transmission, Contact transmission and Hospital acquired transmission. There is a well explained safety measures is provided to inhibit the COVID-19 spread which should be followed properly. There are some testing processes also developed to determine the presence of this virus. Till now not even a single vaccine is developed for the treatment of this COVID-19 but more than 12 countries across the globe are undergoing trial for more than 150 vaccine candidates.

INTRODUCTION

Coronavirus disease was first emerged in china in a wet market where mainly all kind of meats were being sell [1].The infectious persons were associated with that wet market, the patients were shopkeepers, vendors and market visitors. Wuhan city plays a major role in the outbreak of the infection and then finally the market was closed on January 1 2020 [2].The covid-19 pandemic is due to SARS- CoV 2. Mortality rate due to covid-

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19 is found to be high among people over 60 years of age and who is already having some disease like hypertension, diabetes and cardiovascular disease. Till now there are mainly two types of cases are found in patient, one with major to minor symptom and one with completely no symptom, which are called asymptomatic [3]. The coronavirus identified as human pathogens since 1960. Coronavirus can infect human being as well as any other vertebrates. In human, mostly in the respiratory system gets affected and the symptoms range from cold to severe lower respiratory infection such as pneumonia. The main source of coronavirus is thought to be bat, which are also responsible for infections in human due to the intake of bat meat. There are different species of corona virus has been identified in bat [4]. From the discovery of this disease up to now, more than 7 lakh people in India got infected with this virus and the number of deaths has totalled of 20,653 July 7 at IST 11:50. Further WHO has shown that the mortality occurring due to COVID-19 was between 2-8 weeks. Thus, the number of death may be underestimated. The disease is comprises of mild to moderate symptoms, especially 85 % of the patients are found to have mild to moderate symptoms with a incubation period of 14 days. The seriousness of this disease also depends on the age of the patients also. One American survey revealed that elderly patients who are immune compromised, the mortality rate is high and again in infants or age group 0-6 years have a high mortality rate. Another article suggest that the patients who are having some auto immune disorder for example, Diabetes, Neuro degenerative disorder and Cancer they are more susceptible towards this infection and mortality is also high. Mortality related to the disease may be as high as 60% in critically ill patients requiring hospital admission [5].

MATERIAL AND METHOD

In this systematic review and analysis of this review article we searched Pubmed, Embassy, Researchgate and Sciencedirect and other web of scientific databases and articles published from December 31st to June 7, 2020, using the keywords "Coronavirus" "Safety measures of COVID-19 and "History and origin of COVID-19". Considering the urgency of the topic and the need to increase the efficacy of the search and a grey literature survey is done on Google Scholar to capture all the updates. Databases mostly publish by the World Health Organization and other healthcare facilities were screened properly before making any information including all published and pre- proof databases. More information is being collected from the mentioned reference paper, published e- books, government safety posters and authentic news channels [6]. The literature search was restricted to articles issued in English. All the referred databases are authenticated and checked properly to avoid any sort of deception and made sure all the databases medRvix and bioRvix were reviewed [7].

CHARACTERISTICS OF CORONAVIRUS

Coronavirus is a large linear, single stranded, positive strain, RNA genome and this positive genome can act as a messenger RNA (mRNA) [8]. The coronavirus is large virus and with a rough surface and particles with bulbous surface projection. The average size of the virus is about 125nm. The envelope of the virus is consisting of a lipid bi-layer in which membrane, envelope and spike structural proteins are encored (Wikipedia). The coronavirus surface spikes are homotrimers, which is composed of S1 and S2 sub unit. A homotrimeric protein is a protein which is made up of three identical polypeptide units and which are responsible for binding the virus and the host cell [9]. There is a nucleoplasm inside the envelope, which is formed from multiple copies of the nucleoplasm (N) protein, which are bound to the single stranded positive RNA genome in continuous beads on a string type conformation. The lipid bi-layer envelope, membrane proteins, and nucleoplasm protect the virus when it is outside the host cell. All coronaviruses contain specific genes on ORF1 downstream region that encode proteins for viral replication, nucleoplasm and spikes formation. The spike protein that is a conjugated protein in which the non-protein group is carbohydrate are responsible for entering the virus in the host cells [10]. Other coronavirus mostly recognise amino peptidase or carbohydrates as a key receptor for entry to human cell while SARS-CoV and MARS-COV recognise exo peptidase. The inhaled virus SARS CoV 2 likely binds to epithelial cells in the nasal cavity and start replicating. In-vitro data with SARS-coV indicate that the ciliated cells are primary cells infected in the conducting airways. [6].

At this stage the virus can be detected by nasal swab. The PCR technique may be useful for the determination of the viral infection in human body. Perhaps, super spreaders could be detected by these studies. In this RT-PCR technique it is important to have a count on the cycle number of virus life and incubation period and it is better to do nasal swab test will be much more accurate than the throat swab test. The virus (SARS CoV 2) propagates and migrates through the respiratory tract and

infects the lungs and blocks the airways as well as early markers of the innate immune response. As this time, the disease COVID-19 is clinically manifest. During this viral infection the cytokines level used to be high for example CXCL3 or the other cytokines. In viral infection the epithelial cells used to be filled with beta and lambda cells which are responsible for the blockage of the airways or the upper respiratory tract which ultimately lead to difficulty in breathing. These patients can be monitored in home with conservative therapy [11].

MODE OF TRANSMISSION OF CORONA VIRUS

1. **Respiratory transmission**: According to Centre of Disease Control and Prevention (CDC) the pandemic COVID-19 is mainly spread through respiratory droplets specially while sneezing, coughing and while speaking loud with someone when they are carrying viruses. One more important factor is that those people who are spreading virus 25% of them may be asymptomatic [12].
2. **Aerosol transmission-** This is an important source of transmission. Other than coughing, sneezing and talking the aerosol transmission also plays an important role is spreading the virus. This is mainly spread through droplets in case of spitting by infected person or the mucus of that person. People emits droplets in different shapes and sizes and which are small enough to be considered as aerosol and which can suspended in air for hours and can travel in air for 10 feet but depending on the size of the droplets the distance may vary.

Other possible mode of transmission-

1. **Formite spread-** Formite spread is also known as a secondary mode of transmission of SARS CoV 2. This is a mode of transmission in which the virus is transmitted when a healthy person touches a surface or any object where the virus is already present due to touching or sitting by the already infected person. But not proper validation has been found in this mode of this transmission so proper studies need to be performed to proof this mode of transmission [13].
2. **Hospital acquired infection-** In this mode of transmission the virus is transmitted in doctors, nurses and other healthcare professionals when they are associated with the treatment of COVID-19 patients. This is an important mode of transmission as it is associated with the front liners in this pandemic [13].

Recently, WHO declared that covid 19 is found to be air born though it is not well established fact. More studies and experiment should be performed for establishing the data.

SAFETY MEASURES OF COVID-19

- Lockdown of infected areas
- Travel restrictions
- Continuous surveillance and active contact tracing
- Quarantine of close contacts is essential, as they may not have symptoms initially but may develop symptoms later as the incubation period of the virus varies from 5-14 days
- To wear a face mask on a mandatory basis
- Proper measures should be taken by the governments by providing sufficient PPE (personal protective equipments for the health workers.

1. **Personal level protection**

We should cover our face with clothes while sneezing and coughing, one should maintain at least 6ft distance with each other while they are staying outside of their house and we should wear mask before we go out from home.

2. Staying at home

According to WHO, still now there is no vaccine for corona virus, nor any medications that can treat corona virus. So the best way to avoid this infection is to stay at home and eliminate contacts with individuals who have any kind of travel history.

3. **Washing hand:-**

It is recommended to wash our hand as frequent as possible with soap and water by following WHO guidelines for washing hand. Hand should be sanitized with the alcohol based sanitizer whenever there is no access to soap and water.

4. Disinfect surfaces:-

Keeping you germ free wouldn't be effective if the surrounding is not germ free. Cleaning floors, door, windows, and courtyard is very essential. Any type of disinfected can be used for this case.

5. Monitoring our health:

We should monitor our health as frequently as possible like temperature or any symptoms of flu like runny nose, cough, cold, shortness of breath or any other symptoms like fatigue, muscle or body aches, headache, sore throat, nausea and vomiting.

We should not ignore or hide any of the symptoms from the health professionals. If any kind of medical emergency happens immediately seek medical help.

6. Boosting immunity:

According to some American news channel if our immunity is strong enough then we are less susceptible to get infection and if we still got that means we can speedy recovery.

For boosting immunity we can take vitamin rich fruits for example Gooseberry, Lemon, Orange, and also can take vitamin C supplements.

Exercise is also a great way to boost our immunity and pump up our lungs [14].

SYMPTOMS OF SARS CoV 2

COVID-19 virus infects different people in different person in different way. Most of the infected people will develop symptoms from mild to moderate symptoms and which can be cured without hospitalization.

Most common symptoms-

Fever

Dry cough

Tiredness

Less common symptoms

Aches and pains

Sore throat

Diarrhoea

Headache

Loss of taste or smell

Rashes on skin and limb discoloration

Serious symptoms-

Difficulty in breathing and shortness of breath

Chest pain or pressure

Loss of speech or movement [14]

* **Asymptomatic SARS CoV 2 patients**

Previously it was thought that the virus is can be transmit through the patients those who are showing symptoms in terms of coughing, sneezing or touching but recent articles have been shown that the corona virus disease can be spread through the silent spreaders also. The silent spreaders are those who do not develop any kind of symptoms or sometimes mild symptoms but they infect other patients as the virus is already present in their body. These silent spreaders are found to be mostly children and young people who are having strong immunity. It is also found that one can test positive for covid 19 tests without showing mild or no symptoms when they are coming in contact with a COVID19 patients. Depending upon the symptoms we cannot classify CIOVID19 patients but broadly they can classified as

- Patients with mild to moderate symptoms
- Patients with completely no symptoms
- Pre- symptomatic
- Patients with moderate to serious symptoms
- Patients who are having multiple organ dysfunction [15].

TEST FOR CORONAVIRUS DISEASE

Real time PCR technique: Real Time PCR technique is different from conventional PCR technique which is more sensitive and accurate than the conventional. The real time PCR technique is used for the determination of SARS-CoV 2 in the faces of bats as bats were known as primary reservoir of this virus. The technique is mostly used in molecular biology to amplify the desire DNA. This technique is based on the utilization of the DNA polymerase which is an in vitro replication of specific DNA. This test is performed by collecting blood sample or respiratory fluid with the help of a swab the respiratory fluid is collected. The fluid is collected from the nasopharyngeal junction which is done through a narrow stick made of a short plastic rubber that is covered, at one tip, with absorbing material such as sterile Dacron or rayon ensuring viral transport media. The results of this test can be found out within few hours of the test. The sample is mainly collected within 48 hours interval both nasopharyngeal and blood samples for better accuracy in result [16].

Viral sequencing: - The viral sequencing can be done through High- throughput sequencing (HTS) and whole- genome sequencing (WGS) technologies. Monitoring of the viral genomic mutation is important to have better of medical counter measures. So it recommended that sequencing of this virus in a regular basis is important to know the gene mutation or the changes in the sequencing [17].

ELISA technique: - The standard test is ELISA (enzyme linked immunosorbent assay). Two types of antibodies are tested i.e. IgM antibody which rises first after infection and it is an indicator for an active infection and the other one is IgG type of antibody rises later and it is an indication of past infection. This test is useful for the rapid determination of the spreaders may be

with mild to moderate symptom or moderate to high symptoms or with completely no symptoms. [18].

Bronchial fibroscopy: - Bronchial fibroscopy is an endoscopic technique in which the bronchoscope is inserted through the nasal cavity or mouth and sometimes trachea. It is a useful procedure to determine any kind of infection in lungs or bronchiole. Because if any type infection is there in lungs than the alveoli will be full of interferon. Basically this test will determine the amount of interferon present in the alveoli.

Pulmonary function tests (PFTS): - Pulmonary function test is an encroaching technique in which the proper functioning of the lungs is been tested. If any kind of viral infection is there than the airways of the patient may be blocked and the patient may suffer from difficulty in breathing [19].

CONCLUSION AND PERSPECTIVE

The SARS CoV 2 viruses are spreading rapidly worldwide as a global threat. It is very important for the human beings to adapt all the necessary precaution provided by the WHO (World Health Organization). This pandemic also affected the economy and business market across the globe. Though SARS CoV 2 is a respiratory disease, recent studies also shows that it can develop infection in the other parts of our body for example heart, kidney and liver. It is also found that encephalopathy, inflammation in CNS and Guillian Barre is prevalence in COVID-19 patients [20]. Until now no promising vaccine was found for coronavirus. However Glenmark first Pharma firm to get approval for an oral drug to treat COVID-19 patients in India [21]. Recently Drug Controller General of India (DCGI) informed that a company name Glenmark recently launch its first drug for COVID-19 with a brand name fabiflu, which is claimed to be effective in patients who are having a mild to moderate symptoms [22] [23].

The possible mechanism of action of this drug is that it inhibits the DNA replication in cellular level and stops the rapid growth of the virus. Till today not even a single vaccine is developed for the treatment for the treatment of COVID-19. Worldwide more than 12 countries are going through clinical trials for more than 150 vaccine candidate to combat the global pandemic [24].

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Nil

CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTION

Ms. Samia Begam Barbhuiya has collected all the data regarding the review article and Mr. Vicky Bareh has compiled all the collected data. Mr. Parikshit Das and Miss. Caroline Malsawmtluangi has done the final editing of the review article. All the authors read the final manuscript and approved the submitted version.

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