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A Mini Review: Origin, Treatments, Preventions, Real Facts and Viability of the Recent Pandemic of Novel Coronavirus-2019

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Abstract: Background: Outbreak of Coronavirus Disease-2019 (COVID-19) has sent billions of people into lockdown. It has a negative impact on daily life, physical and mental health. Never before was seen such a type of pandemic sparked by a coronavirus. It increased anxiety in the community. Impacts of this disruption affect every sector such as health, finance, education, transport, agriculture, and economical growth of countries. Most of the countries experience insecurity in these sectors.

Objective: To reduce the spread of the novel Coronavirus-2019 and to bridge the knowledge gap of the research community, frontline health workers as well as those persons who are working in this regard to improve critical health challenges so that the community can plan effective prevention. In the present mini-review, we summarized the origin, route of transmission, current therapies of treatment, preventions, viability and real facts of fatal disease novel Coronavirus-2019 (2019-nCoV).

Result: Achieving division of a large population into small-small groups and take RT-PCR tests on a very large scale. It will help to identify and isolate an accurate infected person. Isolation of infected cases and quarantine reduce the transmissibility of COVID-19.

Conclusion: Knowledge about real-time evolution and transmission of the emerging pathogens helps to prevent its infection at all stages. To improve understanding of the risk, mechanism, and treatment in response to COVID-19 is required encouraging case studies, effective treatment therapies, drug discovery and developments. Make awareness in society about sanitation and avoid close contact to escape COVID-19 infection are the best ways of protection.

Keywords: Bat, COVID-19, coronavirus, pandemic, preventions, SARS-CoV-2, transmission.

1. INTRODUCTION

In December 2019, COVID-19 was first recognized in Wuhan, China caused by newly emergent β-coronavirus (SARS-CoV-2). The SARS-CoV-2 deadly virus has hit 210 countries and territories around the world [1,2]. Therefore on 30 January 2020, the World Health Organization (WHO) has responded by declaring the novel Coronavirus (2019-nCoV) outbreak as a public health emergency of international concern (PHEIC) and this is the 6th time, since from 2005 [3].

As of 16 April 2020, more than 2.1 million SARS-CoV-2 confirmed cases, and 144,061 deaths were recorded in the world and the numbers continue to rise [4]. On 7 March 2020, WHO was reported cases of COVID-19 surpassed 100,000 [5]. It took over three months to reach the first 100,000 confirmed cases, and only within 12 days to reach the next 100,000 cases and 3 days for the next 100,000 [6].

Currently there is rapid increase in the number of COVID-19 patients worldwide. SARS-CoV-2 is an emerging pathogen that creates combat against COVID-19 on earth [7]. Mathematical modeling helps to predict the rate of infection [8]. The death rate is higher among the >50 age group. The mortality rate is quite higher than in Italy, Spain, Iran, France, USA and UK [9].

It is one type of massive tsunami in global public health. From the last two decades, all countries face the challenge of controlling and preventing zoonotic transmission of Coronavirus from bat [10]. It’s time to think again, what are we giving to the next generation?

1.1. Origin of Novel COVID-19

SARS-CoV-2 belongs to the large family of Coronavirus, subfamily Orthocoronavirinae, order Nidovirales, genera Betacoronavirus. Coronaviruses are enveloped and have single-stranded positive sense RNA genomes that range in size from 26 to 32 kb [11]. Electron microscopic appearance of the SARS-CoV-2 particle look like solar corona, and had a
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2. TREATMENTS ON NOVEL COVID-19

In the current situation, there are no clinically approved vaccines or drug treatments available against novel COVID-19. Most of the aspects of the SARS-CoV-2 are still not clearly understood. There is a need to understand the COVID-19 to facilitate the identification of diagnostic, vaccine and therapeutic treatment. So strategies of treatment are based on the medical condition of patients.

The early cases of COVID-19 have common symptoms like fever, dry cough, and myalgia. Some other nonspecific symptoms are found such as sputum, headache, hemoptysis and diarrhea [32]. X-ray imaging or Computer Tomographic (CT) scan used to demonstrate pneumonia. Oxygen therapy was used in the mild condition of COVID-19 infected patients. Critical cases should be admitted to the Intensive Care Unit (ICU), used mechanical ventilation when necessary [33]. In general, three drug discovery methods are generally used in the emerging coronavirus outbreak as follows [34]:

(a) Test the existing broad-spectrum antiviral drugs by using standard assays, which have been used to treat other viral infections.

(b) The screening of a chemical library containing many existing compounds or databases, including information about transcription characteristics in different cell lines.

(c) The redevelopment of new specific drugs based on the genome and biophysical understanding of individual coronaviruses.

Numbers of clinical trials are in progress against the treatment of the COVID-19 pandemic [35]. Clinicians and researcher community are racing to discover new potential vaccines and drugs for the treatment of COVID-19. If there is success in making a vaccine, then mass production is also a challenge. Therefore research communities trying to test existing and traditional drugs for the COVID-19, because they know drug interactions, safety profile and their side effects [36].

Hydroxychloroquine has been approved for the treatment of diabetes in India [37]. Hydroxychloroquine is less toxic than Chloroquine, prolonged and overdose usage can cause a poisoning effect on the body [38-40]. Remdesivir and Chloroquine have highly effective against SARS-CoV-2 in vitro, suggesting these drugs be assessed in human patients suffering from COVID-19 [41, 42]. The use of Remdesivir successfully cured SARS-CoV-2 infected patients. This availability opens up new horizons in this area. In contrast to Remdesivir, the activity report of Favipiravir in vitro and in vivo are limited [43].

Several drugs such as Azithromycin, Chloroquine, Hydroxychloroquine, Arbidol, Remdesivir and Favipiravir are currently undergoing clinical studies to test their efficacy and safety in the treatment of COVID-19 in various countries [44-46]. Adverse effects of Lopinavir have been observed in patients with Covid-19 [47]. The course of treatment included twice a day oral administration of 75 mg Oseltamivir, 500 mg Lopinavir, 500 mg Ritonavir and the intravenous administration of 0.25 g Ganciclovir for 3-14 days [48, 49]. Use of Ribavirin and Interferon was not recommended as first-line treatments because of the risk for side effects; however, the use of these medications may be considered if Chloroquine or Hydroxychloroquine are ineffective treatment with Lopinavir/Ritonavir [50]. Quinine can be used as herbal remedies recruited to control COVID-19 [51].

On 4 July 2020, WHO accepted the recommendation of the International Steering committee to discontinue the trails of Hydroxychloroquine and Lopinavir/Ritonavir in the effective treatment of COVID-19, based on evidence obtained, and data collected in solidarity trials [52, 53]. The use of Hydroxychloroquine indicated little or not reduced fatality rate of hospitalized COVID-19 patient compared with standard care, which depends upon age factor.

In the prophylaxis of malarial, Chloroquine or Hydroxychloroquine was used 500 mg or 400 mg per week respectively for 8 weeks. The mainly prolonged dose of Hydroxychloroquine was used in the treatment of autoimmune diseases like rheumatoid arthritis and systemic lupus erythematosus. For the treatment of rheumatoid arthritis and systemic lupus erythematosus using 200 to 400 mg daily dose of hydroxychloroquine is required [54]. Interim results in
COVID-19 cases show that the risk of toxicity, gastrointestinal upset, methemoglobinemia and the adverse cardiovascular effect has been increased with continuous use of a higher dose of Hydroxychloroquine drug than that for prevention based on ideal body weight [55]. This opened the way of the possible development of new antiviral drugs based on Remdesivir, Chloroquine, Hydroxychloroquine, and Azithromycin structures. Plasma therapy has been used in various viral diseases like Ebola, Influenza (H1N1). It is one of the promising options against COVID-19, but requires evaluation in clinical trials.

3. PREVENTIONS OF NOVEL COVID-19

The number of confirmed cases and deaths of SARS-CoV-2 in the world is increasing day by day (Graph-1 and Graph-2). Sharing scientific information is an effective way to reduce public anxieties about COVID-19. Provide real-time guidance to the health care workers to stop the outbreak, also who need to know the epidemiological and clinical features of COVID-19 is helpful. It is essential to share continuous and quickly transparent data of emerging and recent developments about COVID-19. To manage patients, successful clinical practices have been published and used. Authorities give attention to identify the patient in the early stage and focus on quarantine [56, 57].

Patients will be discharged after receiving two successful negative Reverse Transcription Polymerase Chain Reaction (RT-PCR) reports in 24 hours from the oropharyngeal swab. It is essential to keep the patient under clinical surveillance for at least ninety days, taking swabs and blood sample tests every 30 days. Using successive treatment as a guideline because an effective and approved treatment has not been found [58]. According to the World Health Organization (WHO) frequently cleaning hands and avoid touching eyes, mouth and nose are precautionary measures. Avoiding crowd, close contact with infected persons, unsafe contact with wildlife and maintain hygiene in routine life and social distancing are the best precautions [59, 60].

Graph-1: Total COVID-19 cases in worldwide. (A higher resolution / colour version of this graph is available in the electronic copy of the article).

Graph-2: Total COVID-19 deaths in the world. (A higher resolution / colour version of this graph is available in the electronic copy of the article).
4. A REAL FACT ABOUT COVID-19

SARS-CoV-2 is transmitted in all types of climate conditions. This can’t transmit through mosquito bites [61]. A study suggests that stool or rectal swab-testing may be more potential evidence than nasopharyngeal swab-testing in referring to the effectiveness of treatment and help to find out the quarantine period of the patient. Virus shed effect is shown by the gastrointestinal tract because the digestive system might be greater and last longer than that of the respiratory tract [62]. In the pediatrics, no clear signs of pneumonia were found as in adult patients [63, 64].

ACE2 stimulating drugs such as Thiazolidinediones and Ibuprofen would increase the risk of developing COVID-19 but it has to be scientifically tested [65].

5. VIABILITY OF SARS-COV-2

A comparative study between SARS-CoV-1 and SARS-CoV-2 has been performed to evaluate their aerosol and surface viability, estimated their decay rates using a Bayesian regression model. SARS-CoV-2 viable in aerosol for 3h, Copper for 4h, cardboard 24h, stainless steel and plastic 72h at 21 to 23 °C and 40% relative humidity over 7 days, half live of SARS-CoV-2 in aerosol nearly 1.2h, on copper, on plastic 5.6h, on stainless steel 6.8h [66].

CONCLUSION
Case studies indicate that no evidence of maternal-to-neonatal intrapartum transmission of COVID-19 via vaginal route. No neonatal death and stillbirth were observed in pregnant women infected with COVID-19 [67-73]. SARS-CoV-2 is not found in breast milk but it cannot be confirmed yet that COVID-19 infected mothers can transmit the virus via breast milk [74]. No deaths in children have been reported at this moment.

Clinical evidence does not permit the use of corticosteroids for pregnant women infected with COVID-19 may cause low birth weight in infants [75].

CONSENT FOR PUBLICATION
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CONFLICT OF INTEREST
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