

What is known, Origin, and Impact of COVID-19; A of Review of current literature, April 2020

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Abstract

Background: The coronavirus disease, COVID-19 has first emerged in Wuhan Hubei province, China where the sea-based food is sold. Now it is a pandemic affecting a global economy and the pertaining information is still under investigation.

Objective: Summarizing the COVID-19 and its major impact.

Methods: Review of different literature until the date of the submission of this paper.

Conclusion and recommendations: The COVID-19 is causing shock to the world and costing lives. As there is no known vaccine and treatment, everyone should adhere to strict preventive strategies. Stay home, stay safe, and alive.

Keywords: Corona virus; COVID-19; Pandemic

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Abbreviations: ABHR: Alcohol Based Hand Rub; COVID-19: Coronavirus found in 2019; WHO: World Health Organization; PPE: Personal Protective Equipment; R_0 : The Expected Number of Secondary Cases Produced by a Single Infected Person in a Susceptible Population; SARS: Severe Acute Respiratory Syndrome

Background

Introduction

Coronaviruses one of the subfamily of Coronavirinae in the Coronaviridae family and often causes the common cold affect all ages [1]. The term corona literally is to mean crown-like spikes on the outer surface of the virus and hence named as a coronavirus. Coronaviruses are approximately 65-125nm in diameter and contain a single-stranded RNA as a nucleic material. Coronaviruses previously infect only animals now mutated to infect human beings. Among corona families, namely alpha (α), beta (β), gamma (γ) and delta, only alpha (α) and beta (β) can infect human being [1,2].

The coronavirus disease COVID-19 (previously called 2019-nCoV), is a highly contagious and severe viral infection secondary to severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which first emerged in Wuhan, China and later become pandemic whose key reservoir was believed to be a bat. In addition to Bat, the novel coronavirus originated from the human seafood market at Wuhan, China where snakes, raccoon dogs, palm civets, and other animals sold [3]. This virus was called COVID-19 by WHO,

was first detected from a throat swab sample by the Chinese Centre for Disease Control and Prevention [4].

Most SARS-CoV-2 infected patients have developed symptoms such as dry cough, sore throat, and fever. The case fatality rate as reported by WHO was 3.4% the disease leads to death through complications like organ failure, septic shock, pulmonary edema, severe pneumonia, and Acute Respiratory Distress Syndrome [5,6]. Though the disease can infect children, 54.3% of those infected with SARS-CoV-2 are male with a median age of 56 years with comorbidities being associated with prompt intensive care support [7,1]. The COVID-19 is now a pandemic affecting the world several ways. The disease process, vaccine, and treatment of COVID-19 are yet under investigation. Therefore this paper has summarized the surrounding knowledge of this COVID-19.

Methods

Different search engines; Google, PubMed, and others were used to collect different information and News summarizing as follows;

Epidemiology of COVID-19

COVID-19 affects all ages, race, and gender despite the severity and fatality rate may depend on some factors. It affected more than 199 countries but the top ten countries affected are the USA, Italy, China, Spain, Germany, France, Iran, UK, Switzerland, and South Korea [8]. The age group 50+ is linked with a more fatality rate while there is no reported case for those younger than 9 years old.

Pathophysiology and clinical manifestation of COVID-19

There are limited studies about the pathophysiological characteristics of COVID-19 and associated uncertainty about its mechanism of spread. Contemporary knowledge is derived from similar coronaviruses that are communicable from person to person through respiratory fomites [9]. COVID-19 is caused by SARS-CoV-2, a beta coronavirus, containing a single-stranded ribonucleic acid (RNA) structure that belongs to part of the Coronaviridae family. Sequence analysis of SARS-CoV-2 and its genome has been likened to a previously identified coronavirus strain of the SARS outbreak in 2003[10].

SARS coronavirus (SARS-CoV) has a well-defined composition encompassing 14 binding residues that directly interact with human angiotensin-converting enzyme 2. Among these amino acids, 8 have been conserved in SARS-CoV-2. The exact pathophysiological mechanism of SARS-CoV-2 is still unknown due to awaiting laboratory trials [11]. Genomic matches to SARS-CoV could help to elucidate the resulting inflammatory response resulting in severe pneumonia [12]. The ACE2 enzyme which is expressed in type II alveolar cells proposed that Asian males have a large number of ACE2-expressing cells in the lung, which may partially explain the male predominance of COVID-19. However, other factors such as a higher prevalence of smoking among men in China may explain the difference in the sex distribution of the disease [13].

The common clinical manifestations are fever, dry cough, and fatigue. Other symptoms are also identified as headache, sore throat, abdominal pain, and diarrhea. Abnormal laboratory findings include lymphocytopenia, prolonged prothrombin time, and elevated lactate dehydrogenase. Chest radiographs are characterized by bilateral patchy infiltrates [13,14].

Source, reservoir, rate and mode of transmission

A few studies define the pathophysiological characteristics of COVID-19, and there is great uncertainty regarding its mechanism of spread. Current knowledge is largely derived from similar coronaviruses, which are transmitted from human-to-human through respiratory fomites [12]. Among the Coronaviruses, only α and β coronaviruses have the ability to infect humans, the consumption of infected animal (bat; the key reservoir) as a source of food is the major cause of animal to human transmission of the virus and after which further transmission is possible to another person [3]. The samples isolated from the civets at the food market showed positive results for viral RNA detection, suggesting that the civet palm might be secondary hosts [15]. The transmission is by respiratory droplets through the mouth, the eyes, and Nose with the infected person having R_0 of 2.5 [16,17-23]. The patient is most contagious when symptomatic even though there is increasing evidence suggesting transmission during the incubation period (approximately between 2 and 14 days) [3]. The virus also appears to infect through contamination with stool and blood which raises suspicion about other potential modes of transmission [24].

Diagnosis

The diagnosis of COVID-19 is the detection of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) RNA in throat swabs. The technique is subjected to false-negative and still under question if preferred to sputum sample. However, the risk of medical staff exposure to COVID-19 is lower with sputum induction than with nasal or throat swabs and bronchoalveolar lavage methods [25,26]. The reverse transcriptase-polymerase chain reaction (RT-PCR), testing nasopharyngeal and an oral swab or a lower respiratory tract sample such as expectorated sputum, tracheal aspirate, or bronchial alveolar lavage are implicated [13,16].

Treatment

So far there is no drug to cure the COVID-19 but there are promising trials like Remdesivir is found to be active against COVID-19 in vitro [16,27-29]. Anti-influenza drugs namely; umifenovir and oseltamivir are also under investigation [30,31]. Studies also propose Chloroquine and hydroxychloroquine to treat COVID-19[32,33].

Prevention

Social distancing (at least two meters), mobility constraints such as school closings and travel prohibitions, frequent and careful handwashing, avoiding travel to high-risk areas, contact with an individual who is symptomatic, and evading consumption of meat from regions known with COVID-19 outbreak. In the same way, wearing PPE such as face masks (N95) for Health professionals, availing alcohol-based hand rubs (ABHR) at entrances, coughing into elbows, and careful handling of all specimens are also important [34-36]. Staying home (avoiding crowd) and Isolating, and cleaning and sterilizing frequently touch surfaces are ways of preventing COVID-19 [16,34,37].

The impact of the COVID-19

The COVID-19 pandemic has generated extraordinary disruption for the worldwide health and development community. Organizations fighting infectious disease, supporting health workers, delivering social services, and protecting livelihoods have moved to the very center of the world's attention. This affects access, safety, supply and finance that remodel health and development and cause health care crisis [38,39]. As coping up is mandatory, radical transformation of the health care system will affect the ability to maintain high-quality care [40].

The coronavirus outbreak is a major shock for the European and world in general. The EU has taken measures to increase the capacity of their health systems and provide relief to those citizens and sectors predominantly affected. Hence, the flexibility of the EU fiscal rules has reviewed its State Aid rules and deployed a €40 billion COVID-19 to revive small businesses, the health care sector, Farmers and Fishermen [41] (**Figure 1**).

As recovery from the pandemic begins the health care system might face health workforce shortages, many nurses and physicians are experiencing heightened levels of burnout due to the COVID-19 experience and many of them are expect to retire early. The biggest financial impact of the pandemic will likely be

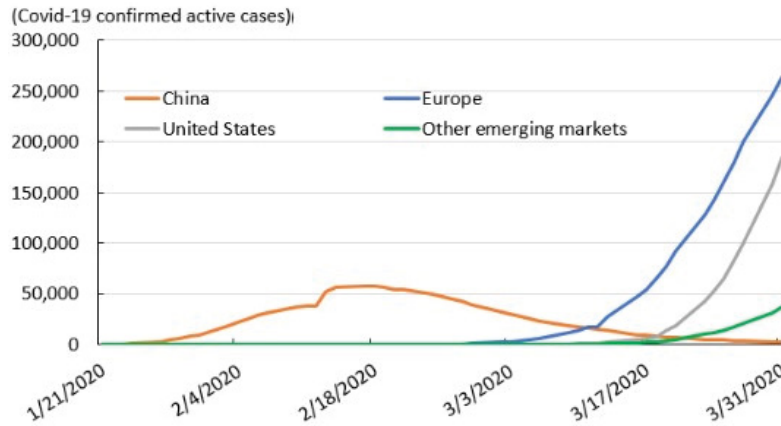


Figure 1 The relationship of the COVID-19 pandemic and its influence in Europe, Asia, and the USA [42].

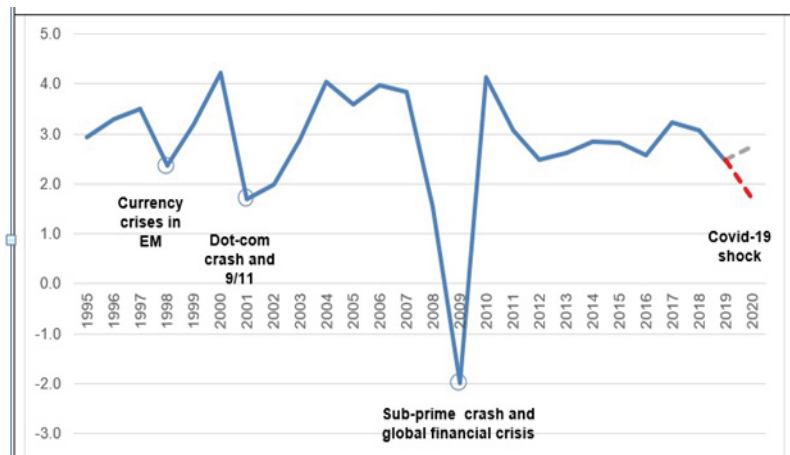


Figure 2 The fragility of the global development by COVID-19 1995-2020.

felt by rural hospital system [42] (Figure 2).

Conclusion and Recommendations

The COVID-19 is affecting the world in several ways and costing life. There is no known effective vaccine and treatment but the WHO and researchers agreed on several preventive ways. Effective hand washing with soap, the social distancing of at least 2 meters, staying home and avoiding crowds, coughing into elbows are the major ones. It is better if everyone adheres to strict preventive strategies to stay safe and alive until vaccination and treatments are ready.

Declarations

Ethics approval and Consent to participate

Not applicable

Competing interests

There is no conflict of interest

Availability of data and material

Not applicable

Code availability

Not applicable

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