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DEVASTATION MONSTER; COVID-19 EVOLUTION FROM SARS AND MERS

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Abstract

COVID-19 caused by SARS CoV-2 struck this world in the industrial city of Wuhan in December, 2019. It was further crowned as a severe pandemic by WHO on March 11th, 2020. Coronavirus transferred human to human or human to animal via airborne droplets and its incubation time ranges from 2 to 14 days. It may persevere asymptomatic, but initially seems as symptoms like seasonal influenza usually cough, fever, sore throat, malaise, breathlessness and fatigue among others. It represents a significant international medical issue with several cumulative confirmed cases. As of 31st March 2021, Pakistan had 678,165 cases of COVID-19, with most 265917 cases from Sindh, 225953 cases, 89255 cases, 19610 cases, 59401 cases, 5045 cases and 12984 cases; from Punjab, KPK, Balochistan, Islamabad, Gilgit-Baltistan and Azad Jammu and Kashmir, respectively. The public is directed to keep social and physical distance in infected regions, to stay home as much as possible, proper hand sanitization/ hand washing, use of facial masks and other cautionary measures as suggested by CDC and WHO.

Keywords: MERS (Middle East Respiratory Syndrome), Quarantine, RT-PCR, SARS (Severe Acute Respiratory Syndrome)

INTRODUCTION

A novel coronavirus was officially declared as the main causative agent of newly emerged COVID-19 by the Chinese Center for Disease Control and Prevention, on January 8th, 2020 (1). First of all novel coronavirus recognized in China (Wuhan) in December, 2019 among patients that shared a common history of visit to a seafood market (in Huanan) which resulted in an unidentified and new form of viral pneumonia-like symptoms (2). On December 31st, Wuhan Municipal Health Commission issued an alert, and rapidly responding teams were actively performing duties in Wuhan by the Chinese Center for Disease Control and Prevention. On other hand, an alarming notification was also sent to WHO (3). From biologic samples the virus was isolated and it was identified as genus beta coronavirus, placing it alongside other MERS and SARS. The corona epidemics (COVID-19) was initially started in Wuhan, China, which later on became a huge challenging condition for a public related health problem not only within China but also among many countries around the world (4). This virus was initially spread rapidly throughout the whole country of China within 1 month during the period of Chinese New Year when the level of movement was very high among Chinese people. This novel virus was primarily named "2019-nCoV" and officially declared as SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2). Although it was too early to expect prone populations, early patterns showed similarity to the coronaviruses of SARS and MERS. Susceptibility appeared to be associated with biological gender, age, and other numerous health conditions (5). Now WHO has clearly declared COVID-19 as a Public Health Emergency condition for International Concern (6).



VIRAL ETIOLOGY

Recent research shows that the mode of SARS-CoV-2 spread is similar to previous SARS-CoV and MERS-CoV i.e. it is also a zoonotic infection with the Chinese horseshoe as the most probable origin (7, 8). This virus is enveloped having ssRNA (single-stranded ribonucleic acid) and a corona-like appearance due to the presence of 9-12 nm-long surface spikes.

SOURCE OF TRANSMISSION

The main transmission source is a patient having symptoms like COVID-19 but recently it is proposed by observations that patients being in incubation period and asymptomatic individuals are also potent carriers of novel SARS-CoV-2 (9). Transmission mode has been established and it occurs from one person to another through droplets from sneezes and coughs. Primary reported cases of viral infection have been sketched to contact with infection containing dromedary camels, the animal recognized as a reservoir host for MERS (10). On so contrary, there is also no evidence for the occurrence of intrauterine infection (11). From close personnel contact, MERS is also transmitted (within health care units during the symptomatic as well as asymptomatic phase), although examples of this transmission medium were remarkably less even during the peak period of the MERS epidemic. Similarly, SARS is also transmitted by close personal contact via respiratory droplets from coughing or sneezing at a very high and rapid rate but relatively at less scale as they compare to the current outbreak of pandemic COVID-19. On the contrary, fecal transmission, fomites, and animals handling (e.g. selling, preparing, and killing animals) are among the less common mediums of transmission.

INCUBATION PERIOD

It has been estimated that for COVID-19 patients general incubation period is 5 to 6 days (average) but it is also confirmed that it could be prolonged up to 14 days. Therefore, now generally adopted quarantine duration for exposed persons (potentially) and medical observation is 14 days (1, 12).

SUSCEPTIBILITY TO INFECTION

Most current observations indicate that people of almost all ages are vulnerable to this newly identified infectious disease. But health care workers, paramedical staff and other patients closely admitted to the patient with asymptomatic and symptomatic COVID-19 infection is at a highly susceptible rate to SARS-CoV-2 disease. In Wuhan, epidemiological studies of a total of 138 patients were hospitalized for COVID-19 showed that n=57 (41%) were supposed to become a target of getting a hospital-acquired infection. Among n=57 patients, n=17 (12%) patients were earlier hospitalized for other medical issues whereas n=40 (29%) were health care workers (13).

EFFECTIVE INFECTION CONTROL

The most important and critical preventive measure for reducing transmission of microorganisms to individuals is hand disinfection. The novel SARS-CoV-2 can remain alive on various surfaces ranging from very few hours to many days which completely depend on temperature, surface type, or the humidity of the surrounding conditions (WHO 2020c). This transmission mode reinforces the intense need for proper hand hygiene conditions and the thorough disinfection of all possible virus-containing possible surfaces within the dental clinic setup, hospitals, and other places. The use of personal protective equipment e.g. Gown, goggles, face shield, mask, and gloves usually recommended for protecting mucosa and skin and from infected secretions or blood. Respiratory droplets containing infectious particles are the most important mode of transmitting SARS-CoV-2 therefore, particulate respirators (e.g. N-95 masks) are recommended.

CLINICAL MANIFESTATIONS



Currently the thorough and complete clinical manifestation isn't available as the most reported symptoms are in the range of mild to very severe and also with some causality cases (14). Most patients experienced dry cough and fever, whereas others had fatigue and breathe shortness. Some patients also suffered from atypical symptoms including confusion, muscle pain, diarrhea, vomiting, sore throat and headache (15, 16). The most frequently reported symptoms of newly reported COVID-19 were dyspnea, cough, fever and pneumonia, while less common symptoms included diarrhea, hemoptysis, headache, phlegm-producing cough, and runny nose. Most patients showed bilateral pneumonia with bilateral patchy shadows and ground-glass opacity were the most frequently reported patterns among patients who were examined through CT (Chest Computed Tomography)

DIAGNOSIS

The detection of COVID-19 can be established by examining epidemiological data (e.g., residence in a highly infected area or travel history within 14 days of shown symptom), CT imaging findings, different clinical symptoms and laboratory-based tests (e.g., RT-PCR) of respiratory specimens following standard protocols of either the National Health Commission of China (2020) or World Health Organization (2020).

TREATMENT

Still there has been no confirmation to suggest any precise treatment therapy for the current infectious disease i.e., anti-nCoV, so the control of novel COVID-19 has been mostly supportive (WHO 2020). As of now, the way to deal with novel COVID-19 spread, is to minimize the main cause of disease; use contamination counteraction and different control measures to bring down the danger of transmission, early finding, quarantine and steady consideration for infected patients. Initial medical reports revealed that oseltamivir in combination with other antibiotics were given to 93% of patients (orally administered 75mg 2x/day)

ROLE OF QUARANTINE

In order to make sure the initial recognition of cases the isolation of infected persons or the complete separation of individuals who aren't sick to monitor their symptoms. As the incidence continues to develop, associated States consider choices to stop the introduction of new illness to other areas or to decrease spread from human-to-human in those areas where the infection that sources new virus is already current. Public health procedures to attain these goals could comprise quarantine, which includes the limitation of excessive movement or parting from the remaining population of healthy individuals who could be exposed to the emerging virus to observe their symptoms and safeguard quick revealing of cases. Several countries in the world have the legal power to enforce the quarantine. It must have to be actualized as it was a portion of a wide-ranging package of public health response and infection control procedures by Article 3, 2005, of the Worldwide Health Regulations (17). Presenting primary quarantine measures in an outbreak might postponement the presentation of the infection to a nation or region or may delay the crest of a new epidemic in a zone where nearby transmission is continuous, or both. Within the setting of the current novel COVID-19 outbreak, the worldwide infection control procedure incorporates the quick diagnosis of laboratory correctly identified and confirmed cases and further their separation and administration either in a therapeutic facility or at domestic (18). WHO suggested that laboratory persons that were in contact with confirmed COVID-19 patients must be isolated for 14 days. Following measures must be practiced to reduce the rapid risk of viral transmission during daily life processes;

1. One meter distance for less than 15 minutes should be maintained having close or personal contact with a patient showing COVID-19 symptoms.
2. Providing direct precautions for COVID-19 patients with the use of appropriate personal protective equipment.

3. All suppliers and external collaborators' body temperatures are monitored and measured selectively.
4. The number of operators in each limited environment is reduced. Other circumstances, as shown by limited hazard, evaluations.

VACCINE TRIALS

Various candidate vaccines containing RNA and DNA as well as live attenuated and inactivated versions are under different pre-clinical evaluations. Moderna is a collaboration with NIAID (National Institute of allergy infectious diseases) developed one candidate vaccine based on RNA, has moved towards phase I clinical trial (19).

DISCUSSION

The SARS virus and another novel kind of viruses emerged from different regions of China in late 2002 and early 2003 which later spread throughout the transmission all over the world (20, 21). SARS outbreak resulted in infecting 29 countries (8000 reported cases) and about 770 mortalities (22). SARS-CoV occurrence was organized in June 2003. Even no single case of SARS-CoV was reported since 2012 but in the same year, a unique coronavirus of human origin emerged within the Middle East that was named "MERS-CoV" (Middle East Respiratory Syndrome-CoV). It is caused by extremely pathogenic RTI (respiratory tract infections) in the Kingdom of Saudi Arabia and further adjacent countries within the Middle East region (23). MERS-CoV infected 27 countries with 2465 reported cases and 850 deaths (24). In the last week of December 2019, novel and fast emerging pneumonia cases were reported from Wuhan city (province Hubei), China (25). The earliest death case was reported on January 11th, 2020. A high level of traveling movements of Chinese throughout the country for Chinese New Year powered the epidemic. Reported cases in different territories of China, other countries including South Korea, Japan, and Thailand (in rapid progression) were reported in those persons who were returning from the origin of infection i.e. Wuhan. Spread to medical healthcare assistants taking care of COVID patients were reported on January 20th, 2020. By January 23rd, approximately 11 million population of Wuhan was put under lockdown with strict limitations of entrance and any type of exit from the district. Quickly this lockdown was stretched out to various urban communities of Hubei territory. Few cases of novel COVID-19 in various nations other than China were testified in those having no travel history to the main origin country China, recommending that resident human-to-human mode of disease transmission was occurring in these nations (26). In detail on February 12th, China modified its data for affirmed cases as many persons were with negative or pending results, however, per day 15,000 cases were expanded as per highlights of radiological, clinical and epidemiological data (27).

COVID-2019 CONFIRMED CASES REPORT (DATE & COUNTRY WISE)

COVID-19 Global Outbreak

As of 31st March, 2021, database of World Health Organization (WHO) confirmed 128,540,982 cases of corona worldwide with 2,808,308 deaths were reported from 215 states (WHO, 2020). Still, this figure is requiring modifying in every single second. The maximum affected nations are USA with greater than 2,808,308 confirmed cases and 2,808,308 deaths. Brazil with confirmed cases, 12,658,109; India with 12,221,665 confirmed cases and 162,927 deaths were reported. Fatality cases have been recorded in other parts of the world containing Russia (4,554,264), United Kingdom (4,345,792), Italy (3,584,899), France (4,569,568), Germany (2,833,173), Turkey (3,317,182), Iran (1,885,564), Colombia (2,397,731) China (102,762), Canada (976,598), Belgium (882,453), Saudi Arabia (390,007), Switzerland (598,366), Netherland (1,272,616), Sweden (804,886), Portugal (821,722), Hungary (661,721), Maldives (24,079), Qatar (179,964), United Arab Emirates (461,444), Bangladesh (611,295), Japan (474,773), Indonesia (1,511,712), Jordan (611,577), Egypt

(202,131), Norway (212,691), Australia (29,304), Malaysia (345,500), Algeria (75,867), Kazakhstan (70,366), Afghanistan (56,517), Ukraine (1,691,737), Iraq (537,457), Greece (93,006), Azerbaijan (261,713), Denmark (230,603), Nepal (277,309), Singapore (60,381) and (Pakistan, 678,165).

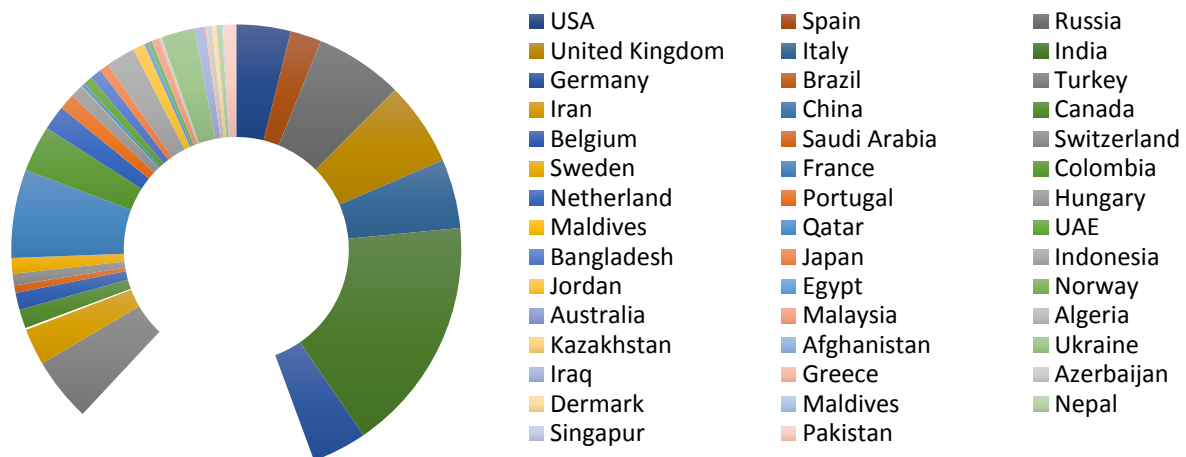


Fig.1. Summary of confirmed cases of Corona virus in different countries till 31 March, 2021.

COVID-19 In Pakistan

The epidemiological survey showed that in Pakistan first COVID-19 patient was identified on March 31st, 2021. The infection spread rapidly throughout the country affecting 678,165 persons with 25 deaths, 31st March (28). Analyzed and observed data demonstrated that Pakistan is also at most higher risk of COVID-19 infection due to in-country traveling. As per the Ministry of Health, Pakistan, currently there are 678,165 positively identified confirmed cases in the country with 3,384 critical cases, 607,205 recoveries, and 14,613 deaths on Wednesday, 31 March 2021 (Fig. 2).

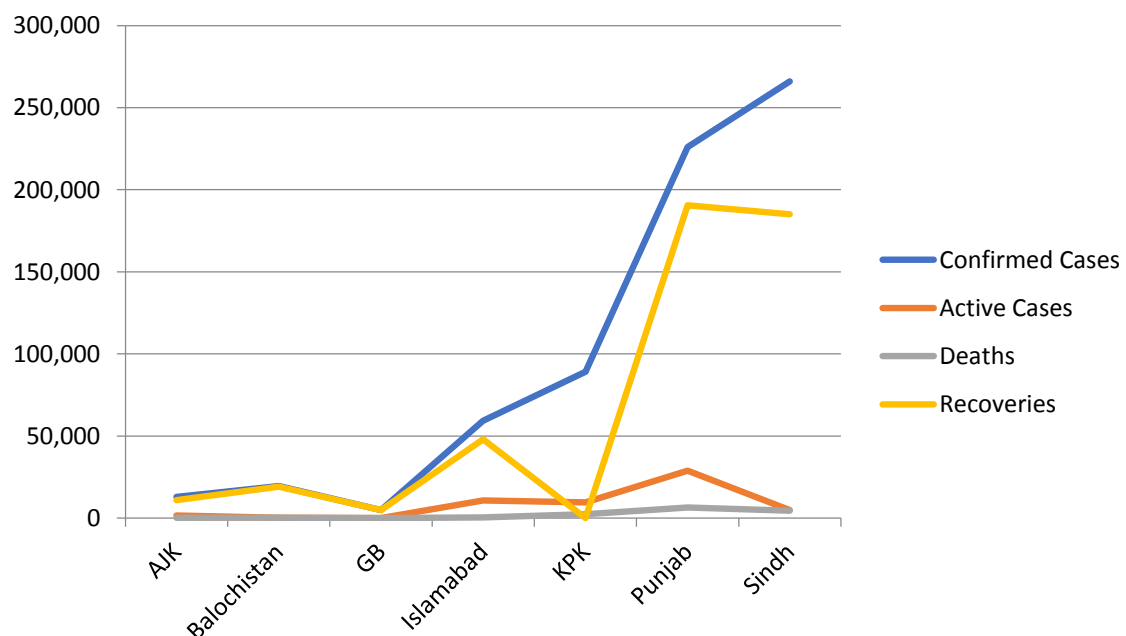


Fig. 2. Summary of confirmed, active cases, deaths, and recoveries of Corona virus in Sindh, Punjab, KPK, Balochistan, AJK, GB and Islamabad, Pakistan till 31 March 2021.

CONCLUSION



The current outbreak of Severe Acute Respiratory Syndrome Coronavirus-2 has reached the aspects of a disease outbreak and WHO (World Health Organization) has confirmed it a global emergency and named it COVID-19. Evidence suggests that it can spread from zoonotic sources. The new and currently emerged coronavirus has maximum similarities to MERS and SARS viruses. RT-PCR is the only type of confirmatory laboratory assay or diagnosis for COVID-19. There is no anticodon virus vaccine available for prevention or immediate care, although some support therapy works. Personal and community based approach is required to prevent many serious repercussions in Pakistan.

It is concluded that the developing countries, including Pakistan, could be at greater risk due to lack of awareness and poverty which leads to negligence in the following of the SOPs.

According to the above cases, the number of patients in Pakistan has gradually increased because almost all of Pakistan's neighboring countries are suffering from this pandemic. So, there is a big threat to the entire territory across the country. The public is directed to keep social and physical distance in infected regions, to stay home as much as possible, proper hand sanitization/ hand washing, use of facial masks, intake of vitamin C to boost-up immune system, and other cautionary measures as suggested by CDC or WHO to reduce the spread of the virus.

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