

The Emergence Of COVID-19 And Its Pandemic Potential as A Global Health Security Threat And Its Effect On Future Life Strategy

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ABSTRACT

The novel Wuhan coronavirus, known as SARS-CoV-2, and the disease it causes, COVID-19, are declared as a global pandemic thus breaking havoc on lives and economies around the world. The extent of the outbreak of COVID-2019, which was discovered quite recently, and its massive impact on lives, societies as well as the economies of the affected countries is unprecedented. Cases of COVID -19 infection have so far been reported in 212 countries and territories where more than 71.2 million individuals have been affected till December 2020, resulting in more than 1.6 million deaths. Both, outside and inside China all around the world, COVID-19 is transmitted via human-to-human transmission, which has resulted in such a global outcome. To decrease the cases all the affected countries were under lockdown and even though the cases were increased dramatically. However, all the daily activities were moved to a virtual reality which adds more impact to investigate the future of the virtual reality and its great impact during this hard time. This paper presents a critical study on the outbreak of COVID-19 by providing an analysis on the confirmed cases at Corona's first wave along with discussing the impact of the disease on social lives and economies all around the world.

Keywords: Coronavirus; COVID-19; SARS-CoV-2; Wuhan; Pandemic, Future studies, virtual reality.

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INTRODUCTION

The major outbreak of a novel coronavirus diseases (COVID-19) in China, which was found recently in late 2019, appears to be one of the tragedies that have surprised the world. The virus termed as the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), is responsible for causing the COVID-19 disease [1]. Coronavirus belongs to the virus family of Coronaviridae, order Nidovirales in the subfamily Orthocoronavirinae [3]. The Coronaviridae family of viruses includes SARS, which impacted Hongkong in 2002 as an outbreak, resulting in 8,000 reported cases and 774 deaths, indicating about a 10% mortality rate [2]. Other variants of SARS-related coronavirus is known to infect humans, bats and certain mammals [3][4] and has been implicated in a lot of previous outbreaks including the Middle East respiratory syndrome coronavirus (MERS-CoV) (September 2012) [4]. Although the COVID-19 is related to the common cold virus, its disease pathway is more elaborate, with reports of severe pneumonia [53]. It was first discovered in Wuhan, China, in 2019. While it is officially known as SARS-CoV-2, it is not the same virus that caused the 2002 outbreak. Nevertheless, these viruses are related. SARS-CoV-2 has a vulnerability that is immediately exploitable and shared by most respiratory viruses and all other coronaviruses. They are remarkably fragile even though they can survive for weeks or even months. Also, they usually tend to thrive at near or below freezing temperatures. These viruses die quickly when exposed to higher temperatures. Their aversion to heat forces coronaviruses to live and reproduce only within the coolest areas of the body such as the nose and the sinus cavities [5].

As of 5th May 2020, a total of 3,724,517 COVID-19 cases have been confirmed around the globe with the total death toll being 258,027. The coronavirus has affected 212 countries and territories around the world along with 2 international conveyances [6]. The unprecedented impact of the novel coronavirus, also known as COVID-19, has brought the global economy to a halt and created a health crisis situation. The virus, which has long existed was known only to exist in animals, however, it has possibly mutated and is now able to exist in humans. The origin of the virus is believed to have emerged from the wild animal markets in Wuhan, China, however this has yet to be verified with evidence [7]. The mutated virus, now capable of transmitting between humans can spread through human contact which is why officials believe social distancing is an effective technique to limit its spread. The virus is not airborne however, it remains to be analysed further when enough experiments are conducted. Surfaces that humans touch frequently remain one of the fastest ways of community transmissions [8].

Expansion of COVID-19

The COVID-19 disease outbreak came to the limelight in late 2019, when several local hospitals in Wuhan, China, reported an unusual number of cases of humans with severe pneumonia without a clear cause. Unlike the seasonal flu and previous pneumonia outbreaks, there was no improvement in the clinical outcome for patients when administered with existing vaccines or medicines. The cases were linked to a seafood market which was involved in large-scale retail of several kinds of fish, chickens, bats, snakes, rabbits and various other wild animals. However, a recent study demonstrated that most of the patients or their family members had not been in a

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direct exposure to the seafood wholesale market, which was linked initially [56]. Nevertheless, a very high human-to-human transmission rate was observed which rapidly progressed within a short period of time [9]. By early January 2020, around 59 suspected cases were identified from local hospitals in Wuhan. These cases were isolated immediately at a local hospital. Out of these 59 suspected cases, 41 cases were confirmed to have the novel COVID-19. However, the isolation of these cases proved very late as before the isolation took place, the human-to-human transmission of COVID-19 had already taken place among hundreds and thousands of human beings [10]. Soon the localised epidemic in central China quickly spread to all other Chinese provinces in just a few weeks' time. Within some weeks, cases in other countries were also reported. This spread in the virus can be attributed to international travellers transmitting this virus. The first reported cases outside China were in countries such as Vietnam, Germany, Thailand, Japan, Australia, United States of America, Russia, and a dozen of other countries[57]. This led to a global panic situation with the first death occurring on 9th January 2020. Quite soon, the death toll started to increase rapidly with an increase in the total confirmed number of cases [11], leading to the declaration of a pandemic by the World health organization on the 11th of March, 2020 [14].

COVID-19 Cases and Recoveries

Figure 1 shows the COVID-19 cases and deaths around the world, as of 5th May 2020. The figure shows that in the period between 21st January 2020 to 25th January 2020, the increase in the total number of cases of coronavirus was low as compared to the later periods. A sharp increase in the cases confirmed in China is evident from 25th January 2020. By early February 2020, around 20,000 cases were confirmed in China while the total number of cases outside China remained low. Around mid-February, a slight change in the trend was seen where the number of confirmed cases was seen to become constant. However, in just a few days, China witnessed another sharp increase in the confirmed cases of COVID-19. This will be explained later in the paper [12]. From late February 2020, it appears that in China, the situation is starting to stabilise in terms of the increase in the number of confirmed cases. However, outside China, there has been a gradual rise in the total number of confirmed cases with a noticeable increase seen from late February 2020 [12]. Around mid-March, a sharp increase can be seen in the confirmed cases outside China. Moreover, while the total number of confirmed cases continues to grow, the confirmed recoveries has exceeded 1,241,831 [6].

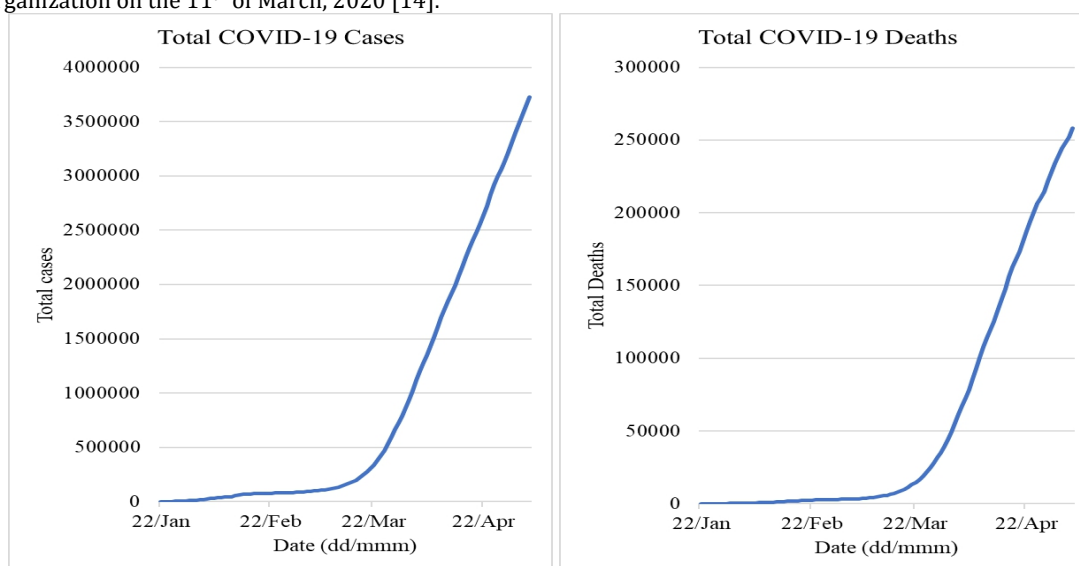


Figure 1: COVID-19 (a) cases and (b) deaths[6].

Comparing these to the trend as of 5th May 2020, it can be seen that there has been an astronomical increase in the proportion of cases and deaths recorded (3724517 and 258,027 respectively). Due to the trend in new cases and number of deaths, the World Health Organisation declared the epidemic as a global health emergency initially [13] but on 11th March 2020, the WHO officially declared the coronavirus outbreak as a global pandemic [14]. Figure 2 shows a clear illustration of the daily new cases of COVID-19 in China [6].

As mentioned earlier, from late January onwards, a rise in the daily new cases is observable. However, in mid-February, there was a sudden peak in the results obtained. This sudden increase in the number of confirmed infections can be attributed to a greater ability

in the identification of new infections using more rapid and reliable diagnostic tools and containment of the illness. Also, the sudden increase in figures does not represent a rapid overnight spread of the virus in China, instead it represents a change in the way confirmed cases are quantified [15]. Soon after, the sharp rise in the confirmed number of coronavirus cases in China transformed into a gradual rise. This is confirmed by Figure 3 which shows the number of infected people on a daily basis. Based on this figure, it is apparent that after mid-February, there was a gradual decrease in the active cases in China, most likely due to the establishment of emergency specialist coronavirus hospitals in regions with the highest burden of infection to relieve the burden on current medical facilities.

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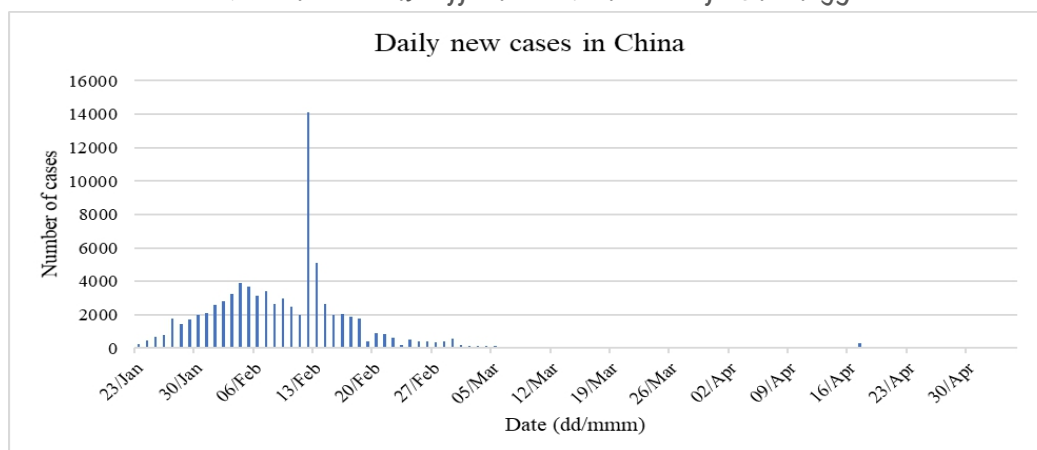


Figure 2: The daily new cases of COVID-19 in China [6].

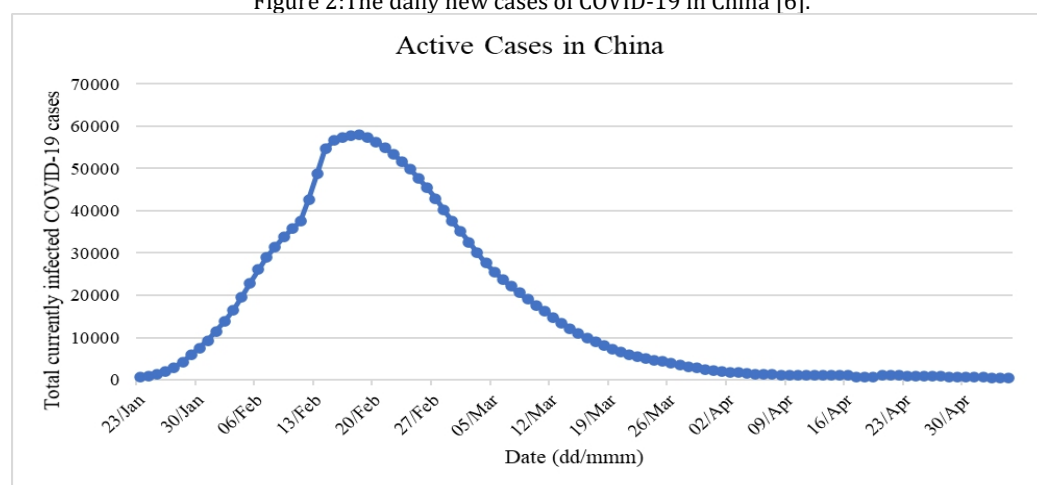


Figure 3: Active cases of COVID-19 in China showing the number of infected people on a daily basis [6].

COVID-19 Mortality Rate

In terms of the daily new deaths occurring in China, Figure 4 shows this information. As illustrated by the

figure, while there was a rise in the number of deaths till mid-February, from late February till today, there has been a decrease in the number of deaths due to COVID-19.

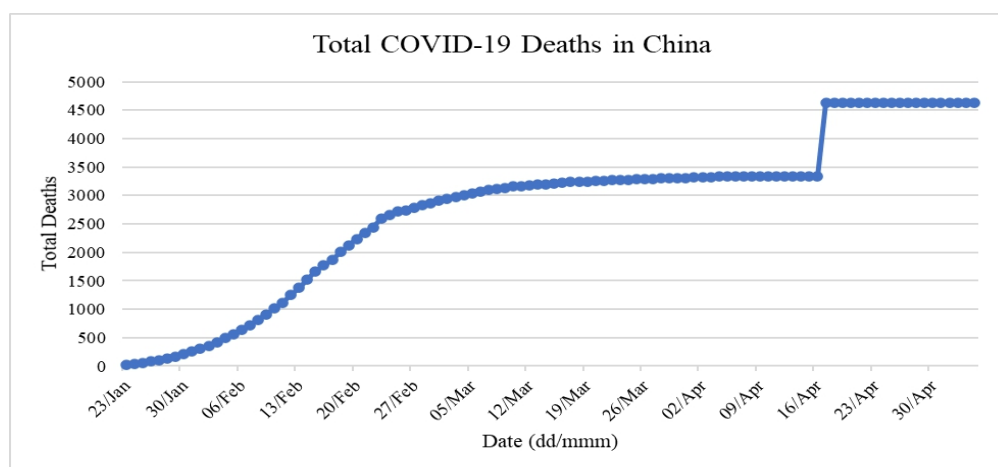


Figure 4: Total deaths due to COVID-19 in China on a daily basis [16].

Comparing the data presented in Figure 4 to Figure 1b, which highlights the global mortality, it can be seen that there has been a linear increase in the number of total deaths globally. While the situation seemed to stabilise after early March, a sharp spike was seen in the data on 17th April 2020. Officials stated that this revision was mainly because of overwhelmed hospitals and medical staff, which meant some people died at their homes after being unable to be admitted to the hospitals. In addition,

the surge of patients also meant delayed or missed reports about infections and deaths. As of 5th May 2020, 9 countries around the world have had more than 100,000 cases of COVID-19. Table 1 below lists the top 10 worst affected countries and their corresponding fatality rates. Overall, from these 10 countries, it can be noticed that while USA has the most cases, the highest fatality rate is in the United Kingdom and France, followed by Italy and Spain. It appears that China is able to not only control the

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spread of the disease but is also able to prevent the deaths. Whereas, the number of deaths in Europe signify that the countries are not able to fully control the situation and may indicate the need for immediate help in forms of medical officials and prevention policies [6]. The high transmission rate recorded in Italy can be attributed to the population density of the cities whilst the mortality

rate may have a relationship with the ageing population with a median age of 47.3 years [55].

Table 1: Total COVID-19 cases, corresponding total deaths and fatality rates for different countries (as of 5th May 2020)[6].

Country	Total Cases	Total Deaths	Fatality Rate
United States of America	1,237,633	72,271	5.8%
Spain	250,561	25,613	10.2%
Italy	213,013	29,315	13.8%
United Kingdom	194,990	29,427	15.1%
France	170,551	25,531	15.0%
Germany	167,007	6,993	4.2%
Russia	155,370	1,451	0.9%
Turkey	129,491	3,520	2.7%
Brazil	114,715	7,921	6.9%
Iran	99,970	6,340	6.3%

Gender distribution of COVID-19

Evidence from earlier researches has suggested that previous epidemic outbreak responses were unsuccessful in capturing meaningful gender-relevant data. Such a response may have vital gender implications for the preparedness and response of any disease outbreak. It is extremely important to present data in a disaggregated form. This is because such a disaggregated data may assist in informing which of the gender is more or less susceptible to a disease such as COVID-19. In addition, this would help in studying each gender's socio-economic realities and allow to better address the specific needs of each gender [17]. Further analysis on the COVID-19 cases in China indicates that males may be at a higher risk than women even though both males and females have been infected in roughly equal numbers. The mortality rate among men was seen to be 2.8% and 1.7% among women, as of early March 2020. Furthermore, science and health reporters have indicated that a large number of deaths have been of elderly Chinese males. While some health officials have linked this to the fact that 50-80% of all men smoke in China compared to the 2-3% of the women smokers, it is also suggested that males have an increased incidence rates of chronic illnesses such as cardiovascular diseases, which can then increase their risk to becoming more seriously ill if infected with the virus. In addition, if the virus impacts males more than females, then for obvious reasons, the health care systems will be quantifying more males than females. Moreover, some researchers also suggested that due to biological aspects, females may have stronger immunity to viruses as compared to males [17].

COVID-19 in the Middle East

It appears that COVID-19 is the second coronavirus outbreak which has affected the Middle East, the first being the MERS-CoV, which was reported in 2012 in Saudi Arabia. Following the Wuhan coronavirus outbreak, United Arab Emirates was the first Middle Eastern country to report a COVID-19 confirmed case. Amongst the various Middle Eastern countries affected by COVID-19, Iran appears to be the one with the highest number of cases [34]. Other Middle Eastern countries affected by COVID-19 include Turkey, Israel, Qatar, Saudi Arabia, Bahrain, Egypt, Lebanon, Iraq, Kuwait, United Arab Emirates, Jordan, Cyprus, Palestine and Oman [6].

COVID-19 in Iran

Figure 5 provides an illustration on the daily new cases of COVID-19 contracted in Iran. It can be determined by the figure, that while there were no cases of COVID-19 reported around the mid-February time period, few cases were reported by late February. Soon, the country started to witness a surge in the cases reported. Initially, in Iran, from 21st February 2020 to 26th February 2020, there were less than 50 cases reported on a daily basis. However, from 27th February onwards, the country started to record more than 100 cases daily. With a rapid rise in the confirmed cases being reported, there were more than 500 cases reported daily. Since 12th March, the country has reported more than 1000 cases daily [6]. As of 5th May 2020, Iran has 99,970 total COVID-19 cases. A total of 6,340 deaths have occurred in Iran due to COVID-19 [6].

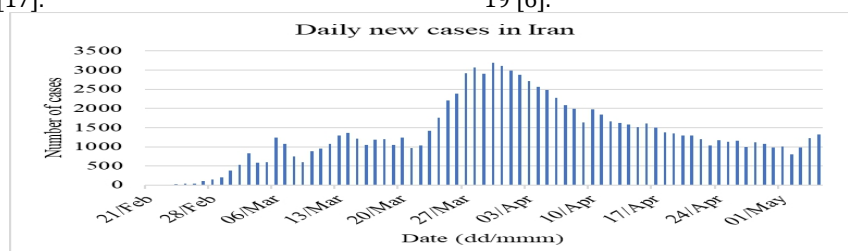


Figure 5: Daily new cases of COVID-19 in Iran [6].

While the country continues to experience the negative effects of the outbreak, the economic loss incurred by COVID-19 coincides with its politically induced

sanctions. Due to the unilateral sanctions imposed on the country, the country is now suffering from a total economic lockdown. As a result, the Iranian health sector

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is immensely affected [35]. The country is falling short in battling against the calamity as all aspects of diagnosis, treatment and prevention are hampered [36]. There appears to be a shortage of vital laboratory, medical and pharmaceutical equipment. In addition, the lack of necessary medication has resulted in increasing the negative effects of the pandemic along with the increase in the number of fatalities. While WHO and several other international organisations have provided necessary medical supplies to the country, the pace of the outbreak in addition to the negative effects of the sanctions have led to a decreased access to life-saving medications as well as equipment[37] [38]. Thus, the country continues to struggle to access necessary resource, which is resulting in even more deaths as well as confirmed cases of COVID-19 [39].

COVID-19 in Iraq

Around the globe, as the spread of COVID-19 continues, some officials in Middle Eastern countries fear the situation could deteriorate if tight measures are not taken to prevent the spread of the virus. For instance, while the number of cases in Iraq is still manageable, the Iraqi Minister of Health stated his concern that in the event of the increased spread of the disease, as in other countries,

Iraq does not have the means to face it. Figure 6 shows an illustration on the daily new cases of COVID-19 contracted in Iraq since 25th February 2020. Overall, while there has been a rise in the number of cases reported over the last few days, it appears that the country has done particularly well in preventing the spread of the outbreak, based on the confirmed cases reported. While a total of 2,431 cases have been reported in the country, 1,571 cases have recovered and a total of 102 deaths have occurred due to COVID-19 in Iraq, as of 5th May 2020 [6].

The country's health minister announced a new series of strict and tight measures which will last up to three weeks to prevent danger. In addition, the authorities have formed a crisis unit, which comprises of ministers from different sectors such as health, interior, higher education and education, immigration and environment to ensure the implementation of decisions. The crisis unit announced some important guidelines to prevent the spread of the virus. These include halting flights from Italy and Iran, closing public stores, parks, cinemas, malls, swimming pools, restaurants and cafes. Also, universities along with schools have also been advised to close. With the exception of health and security institutions, working hours have been either reduced or suspended[40].

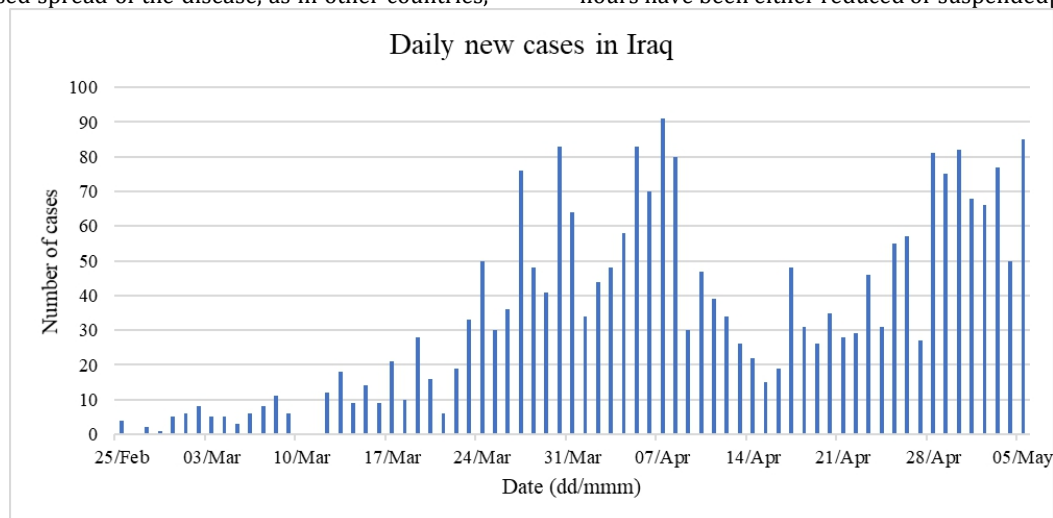


Figure 6: Daily new cases of COVID-19 in Iraq [6].

COVID-19 in the United Kingdom

Figure 7 provides a map of COVID-19 infection within the United Kingdom to date. As of 5th May 2020, almost 195,000 cases have been confirmed in the UK with more than 29,000 fatalities [58]. The burden of infection in the United Kingdom is limited due to the measures taken into account in halting the spread of the virus including shutting down of schools, public spaces and

non-essential amenities. The chart shows that the number of daily new cases in the UK was very low prior to 6th of March 2020. However, there is a noticeable surge in the number of cases after March 12, possibly due to the impression given by the government that the disease causes mild pneumonia and can be easily cured. From mid-March onwards, the daily new cases in the UK have increased rapidly.

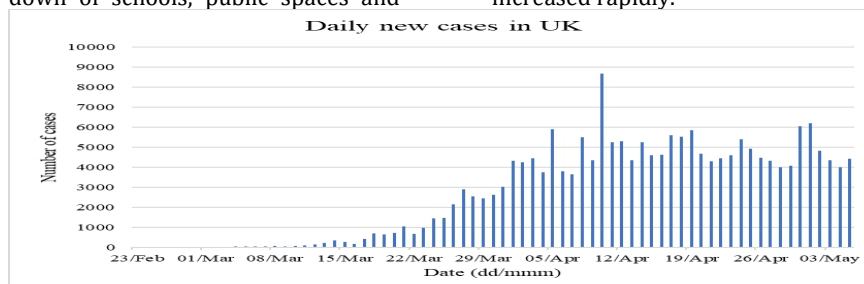


Figure 7: Daily new cases of COVID-19 in UK [59].

Comparison of COVID-19 to other viruses

Table 2 presents a comparison of COVID-19 to other major viruses [18]. Based on Table 2, the intensity of

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COVID-19 and its effect on human lives is clear. While the disease continues to spread rapidly, its subsequent fatality rate is still lower than a number of other diseases which have spread in the past around the world [18]. The history of infectious diseases shows that smallpox and measles were some of the most deadly known viral diseases. Thousands of years ago, these diseases mostly spread in Europe and North Africa [19].

According to Table 2, the classification of viruses shows that the Marberg virus was the deadliest virus with the highest fatality rate where patients suffered with bleeding of mucous membrane, skin and organ.

Table 2: A comparison of COVID-19 to other major viruses (Adapted from [18]).

Virus	Year identified	Cases	Deaths	Fatality rate	Number of countries and territories affected
Marberg	1967	466	373	80%	11
Ebola*	1976	33,577	13,562	40.4%	9
Hendra	1994	7	4	57%	1
H5N1 Bird Flu	1997	861	455	52.80%	18
Nipah	1998	513	398	77.60%	2
SARS	2002	8,096	774	9.60%	29
H1N1**	2009	>762,630,000	284,500	0.02%	214
MERS***	2012	2,494	858	34.40%	28
H7N9 Bird Flu	2013	1,568	616	39.30%	3
COVID-19*	2020	3,724,517	258,027	6.9%	212*
*As of 5 th May 2020 **Between 2009 and 2010 ***As of November 2019					

Symptoms of COVID-19 to other viruses

In terms of coronavirus patients, these individuals are known to suffer from respiratory illness, cough, fever and pneumonia [20]. Overall, the disease results in flu-like symptoms. COVID-19 seems to start with fever and a dry cough. In a weeks' time, the disease can result in shortness of breath. About 20% of patients require hospital treatment in a weeks' time. It is worth mentioning that while COVID-19 symptoms are similar to flu-like symptoms, it is very rare that patients will have a runny nose, sneezing issues or sore throat. These symptoms are often signs of a common cold. However, COVID-19 is known to disturb the lungs of infected patients. To elaborate, the inflammation in lungs reduces the functioning capacity of lungs and thus the lungs are not able to perform their functioning adequately. As a result, the kidneys and intestines also have reduced functionality with a risk of multi-organ failure taking place [21] [22].

Patients with pre-existing conditions

COVID-19 is seen to affect older people the most, especially ones with serious pre-existing health conditions such as chronic respiratory diseases, hypertension, diabetes and heart diseases. This is because of the weak immune systems of older people where their immunity is unable to combat against diseases in a rapid and effective manner when compared to younger people [22] [41]. However, it must also be noted that some healthy people also have been seen to develop a severe form of pneumonia after being infected by the virus. The relationship between age and sickness associated with COVID-19 is still not clear and is subject to new studies. An interesting publication presented in the Chinese Journal of Epidemiology on 17th February 2020 considered 72,314 cases of confirmed, suspected and asymptomatic cases of COVID-19 in China. The paper determined that out of these cases, 80.9% of the infections developed were mild and the patients could recover at home. However, 13.8% of the cases were

found to be severe, where the patients were prone to developing severe complications such as shortness of breath and pneumonia. Further 4.7% of the cases were established as critical and the concerned patients were noted to suffer from complications such as respiratory failures, septic shocks and multi-organ failures. The virus was declared fatal in 2% of the reported cases with the death risk increasing with age. Also, relatively less cases were noticed among children. These findings reveal that while the virus outbreak has affected and infected a large number of people, most infected cases are seen to be mild with recovery highly probable [22] [42].

COVID-19 forecast

With more than 3,724,000 cases and more than 258,000 deaths around the globe, experts dealing with this situation feel that the outbreak is unbelievable and have described the situation as one that will now be difficult to contain. Analysis on the data obtained reveals that it took over three months to reach the first 100,000 confirmed cases, and only 12 days to reach the next 100,000 [46]. As it is possible that some infected patients show no symptoms, it is likely that these individuals are carriers of the virus where they contribute to the rapid transmission of the germs with less or even no control on such a transmission [23] [43], this aided by freedom of movement within regions. The WHO believes that there may be several unconfirmed cases in the world and thus there lies a possibility that the virus spread will not end completely and might continue to infect individuals for a long time. The WHO has classified the virus cases into three categories: confirmed cases, suspected cases and probable cases. Confirmed cases are ones where a laboratory test has confirmed the presence of the virus in the patient, regardless of the clinical signs and symptoms. Suspected cases are ones who have acute respiratory illness, had a contact with a COVID-19 patient and/or have travelled to a place with a widespread of COVID-19. Probable cases are referred to suspected cases for whom testing for virus causing COVID-19 is inconclusive (based

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on the test results reported by the laboratory) or for whom testing was positive on a pan-coronavirus assay [14].

COVID-19 influence on societies and economies

According to psychologists, extreme anxiety and panic is common in most individuals. With the widespread of COVID-19, anxiety levels among individuals are increasing [24]. With the outbreak of the disease and as the virus continues to spread all around the world, individuals are now feeling that no place is safe. Most of the people are now working from homes [25] and many educational institutions are arranging online classes [26]. In addition, religious places and centres of worships along with shopping outlets have reduced attendance. Moreover, panic buying amid coronavirus fears has started to take place, which as a result has affected a number of people [27].

The world's economy has been negatively affected by this virus and economist are now reporting that growth has reduced to 1.5% as factories are seizing production while workers are in isolation to protect themselves from the disease [28]. With the spread of the virus from China to major countries such as Italy, Iran, Spain and Germany, most investors are not willing to invest any further. This has affected the world's stock markets as well along with several multinational businesses. For instance, car sales dropped by 92% in the first half of February. Several events are now being cancelled or postponed [29]. In addition, most of the research in different fields even in water treatment [53-67] around the world were stopped due to the lock down, although some research were done to investigate the spread of COVID 19 [65-71]. Thus, the money circulation appears to be at a standstill. Furthermore, the tourism industry appears to be also negatively impacted with several countries closing their borders by imposing travel restrictions and bans. Such restrictions are now having negative influences on the tourism sector [30] [44].

Treatments and Recommendations

Currently, there are no specific treatments or vaccines for COVID-19 [31]. However, it is suggested that some type of treatment can aid in relieving the symptoms until the patient recovers. It is also stated that antibiotics are not helpful as they are unable to protect or combat against viruses [32].

As the pandemic continues to spread, one source suggested that anti-inflammatory drugs such as cortisone or ibuprofen could worsen the infection. However, based on scientific evidences, it is determined that nonsteroidal anti-inflammatory drugs do not put patients of COVID-19 at risk of increased severe diseases. Hence, reports are now suggesting that patients who consume nonsteroidal anti-inflammatory drugs for other reasons should not stop doing so for fear of increasing their risks of developing COVID-19. Nevertheless, while there appears no scientific evidence to support that such anti-inflammatory drugs can have an influence on developing COVID-19, health officials are still not certain regarding this information [33].

All around the world, there are several ongoing clinical trials, which are aiming to evaluate the potential treatment of COVID-19. As soon as clinical findings are available, WHO aims to provide updated information [31] [47]. In parallel, the world's population has been given some general prevention instructions to prevent the

infection and to decrease its transmission. These prevention guidelines include washing hands on a regular basis with water and soap or cleaning them with alcohol-based hand rubs. In addition, it is recommended that individuals avoid unnecessary travel along with staying away from large cohorts of people to practice physical distancing. Activities which can weaken lungs such as smoking must be refrained from. Also, if an individual feels particularly unwell, they should try to stay at their home. Furthermore, covering mouth and nose when sneezing or coughing is also suggested while unnecessarily touching one's face must be avoided. A distance of 1 metre must be maintained between a person who is coughing or sneezing and another person [31] [47] [48] [49] [50] [51] [52]. Overall, health officials are recommending patients and non-patients to stay in isolation away from other people to prevent the spread of this outbreak.

CONCLUSIONS

The virus termed as the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), responsible for causing the COVID-19 disease, has resulted in more than 3,724,000 cases and more than 258,000 deaths around the globe. While the virus is believed to have been initiated in China, it soon spread around the entire world due to human-to-human transmission, thus making it a global pandemic. The outbreak of COVID-19 has had and continues to have a huge influence on lives and economies. The spread of the current outbreak has been difficult to contain due to the spread of the virus to high population density areas, thus making isolation difficult. Although till date no coronavirus vaccine is ready for delivery, progress is being made to produce a safe coronavirus vaccine. Despite the increase in number of confirmed cases of COVID-19 around the globe, several unanswered questions as well as controversies remain. In order to combat the current outbreak of COVID-19 successfully, a coordinated global action is needed.

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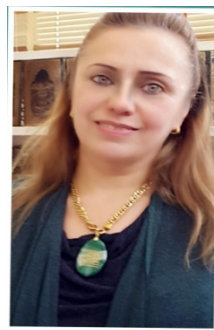
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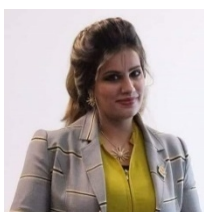
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