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Evolution and impact of COVID-19: A comprehensive overview

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Abstract. This article focuses on COVID-19 during different times, from 2019 to 2024. Which include the background of COVID-19, structures, prevention spread ways and vaccines. Introducing these things about COVID-19 can help people know more about this various, although COVID-19 does not affect humans as much as it used to, and can help people know what got improved during the COVID-19 time, such as the vaccine. By reading this article, people can know more about the details of COVID-19 and can also know more ways to protect themselves. Also, readers can know different kinds of the variant with time goes then appears in the world, and development in the vaccine. This paper explores COVID-19's impact on humanity, the evolution of the virus, and advances in vaccines and treatments, providing insights into the pandemic's progression and response.

Keywords: Covid-19, prevention, vaccines.

1. Introduction

Nowadays, the COVID-19 seems disappear in this world. However, During the COVID-19 time, The COVID-19 impact the whole world. From 2020 to 2022, people's lives have been put on hold, more and more people infected with COVID-19 and scientists stared study vaccine and medicine. Everyday had tons of people dead because of COVID-19. As time go on, with the advent of vaccines and medicine, people are not afraid of COVID-19 like before. Also, as the virus changes, COVID-19 has become less of a threat to people. At first, the when COVID-19 outbreak in Wuhan, so in the social media people usually call this virus Wuhan coronavirus" and "coronavirus" [1]. Gene structure is a very important aspect of virus naming, which can help study medicine and vaccine development [2]. So, the International Committee on Taxonomy of Viruses (ICTV) named this virus "severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)" in 11 February 2020 [2]. Then, on 11 February 2020, WHO used "COVID-19" as the new name for this new disease.

The COVID-19 is an acute atypical respiratory disease found in China, Wuhan in December 2019, which is a novel coronavirus. The COVID-19 cause a very damaging impact on global health because this virus spreads quickly and is accompanied by a high death rate and high incidence. At the beginning, people thought the COVID-19 was a zoonotic disease between people and animals. The virus is spread through people in seafood markets and contact with wild animals [3]. However, when people find out COVID-19 is also spread from person to person [3]. Over time, COVID-19 has killed millions of people in the world, especially the elderly [4]. Since 2020, researchers started to study COVID-19 vaccine.

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During the 2020 COVID-19 time, at least 3 million died because covid [4]. Because of that, so researchers stared study vaccine, medicine, and anti-epidemic measures.

Up to now, many companies have had developed vaccine for COVID-19. After research and clinical trials, there are two types of COVID-19 vaccines licensed or authorized in the United States, mRNA COVID-19 vaccines and Protein subunit COVID-19 vaccines. CDC recommend people in the United States to use Pfizer-BioNTech COVID-19 Moderna COVID-19 Vaccine (2023–2024 Formula Vaccine and Moderna COVID-19 Vaccine (2023–2024 Formula [5]. Also, there are some medicines for treat COVID-19 which include Nirmatrelvir with Ritonavir, Molnupiravir and Remdesivir [4]. Among Nirmatrelvir with Ritonavir can applicable to adults and children ages 12 years and older; Molnupiravir applicable to adult, and Remdesivir applicable to adults and children [4]. This paper will focus on the how does COVID-19 affect people and the different variants of the COVID-19. Also, this paper can help people know more about COVID-19 in the different times.

2. COVID-19 structure

In the end of 2019, scientist found a coronaviruses SARS-CoV-2 in China, Wuhan. Then the World Health Organization (WHO) used COVID-19 for this new coronavirus disease. Among “CO” mean corona, “VI” is means virus, “D” is stand for disease and “19” is the year when scientists found this virus [5]. COVID-19 is a part of viruses and like other coronaviruses, it is looks like a ball under the microscope, and with spikes protruding, which are some proteins stay in the COVID-19’s surface [6]. When the COVID-19 comes into people’s bodies because this virus has spikes protruding, so they can use these spikes protruding adhere to the body cells and let viral membrane and cell membrane combined together [6]. Then COVID-19 virus can go into our body cells and reproduce more COVID-19 virus [7]. Also, COVID-19 has the biggest genomes in the RNA virus, which is between 25 to 31 kb [8]. When people get COVID-19, it can cause severe respiratory infections for human and can cause a lot of people to die.

3. COVID-19 spread ways

COVID-19 is very easy spread from people to people and with highly efficient. If a person got COVID-19, when they are talking, coughing, singing, breathing or sneezing, it will have some very little particles and some droplets came out from people’s nose and mouth [9]. This kind of small particles and droplets contain the COVID-19 virus. Also, these particles and droplets can stay in the air and spread to many different places.

Thus, when a person who didn’t get COVID-19 stay very close which is less than six inches, to a person who got COVID-19, then, these small particles and droplets will be breathed by the person who didn’t get COVID-19 and finally cause this person to get COVID-19. However, if people stay in a very closed room, and with not very good ventilating system, then the people can get COVID-19 very easily too, and this kind of spread can ignore the distance between people and people.

Sometimes during the spread period, when people use their hands to touch their face, nose, eyes, and mouth, then the COVID-19 has a chance to spread in this way too. This is because some small particles and droplets are in the air, and sometimes people’s hands can have some of these small particles and droplets. So, if people use their dirty hands to touch their face, noes, eyes, and mouth, then the COVID-19 virus can have a chance to go into people’s body, then it can also cause the people got COVID-19.

4. Symptoms

COVID-19 has incubation period, usually between two to fourteen days, and the average incubation period is between six to seven days [9]. After people get COVID-19, the most common symptoms include fever, sore throat, and chill. However, different people have different symptoms, this depends in very one’s body. Some fewer common symptoms are including headache, hoarse voice, dizziness, runny or blocked nose or sneezing and more [10]. Some severe symptoms such as can not breath normal, lost sense of taste or sense of smell and can’t talking or moving, then these people should go to see doctor immediately [10]. Some people already got some other disease, such as HIV, cancer, or dementia,

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then after they get COVID-19, they have to receive inpatient treatment if their condition is severe. If the condition becomes more severe, then it might cause very important consequences which include death, sepsis, respiratory and more [10].

5. Prevention

Right now, scientists are already researching and developing many different types of vaccines to prevent COVID-19. As vaccination rate become higher, only a few of people will become infected by COVID-19. So, getting the vaccine is an important way to prevent COVID-19. Also, the World Health Organization (WHO) gives some ways to let people prevent themselves, which include wearing masks, staying away from each other, always remembering to wash your hands, or using alcohol-based hand rub or soap and water to wash your hands, and if you feel you got covid please do quarantine immediately or go to the hospital [10].

Wearing a mask or respirator is important for people during the COVID-19 pandemic in many ways. Wearing masks or respirators can help block the small particles and droplets in the air. It can protect people from contracting the COVID-19. Also, if someone gets COVID-19 but wearing the masks or respirator, then the masks and respirator also can protect surrounding people. When this person talking, breathing or coughing, the masks can filter the small particles and droplets from this person [11]. At the same time, it can reduce other people's chances of contracting the COVID-19.

It can be seen what kind of masks we should wear from the information in the WHO. Some respirators such as N95 filter facepiece respirators are approved by the National Institute for Occupational Safety & Health (NIOSH) [11]. KN95 are also conforming to international tests [11]. So, these kinds of masks can help people prevent COVID-19. One more thing people have to know is when they wear a mask, the mask has to fit the face. If not, then this mask can not prevent COVID-19 very well.

During the COVID-19 time, everyone should pay attention to personal hygiene. Refer to the suggestion that World Health Organization (WHO) gives, people should follow the suggestion, cause these suggestions are very beneficial for people. Take use alcohol-based hand rub or soap and water to wash your hands for a little example. The alcohol-based hand rub or soap can achieve a certain degree of sterilization. People can use this kind of alcohol-based hand rub and soap to clean their hands before eating, after using the bathroom or hands get dirty. The alcohol-based hand rub and soap can help keep our hands clean. However, the alcohol-based hand sanitizer has to contain at least 60% alcohol, otherwise, this kind of alcohol-based hand rub can not clean our hands very well [12].

WHO mentions another important thing social distancing and explains what social distancing is. Social distancing basically is kept away from other people. Such as spend most time stay in the home, avoid going to crowded place which including shopping mall, restaurant, and gym and use phone to be chatting with each other instead of talk to other people face to face. The individuals can do are avoid people who infect COVID-19, avoid crowded area such as shopping mall, restaurant, and gym. This is because in these places people can not keep social distance from each other and try not to go out. Organizations can do are companies can let employees work at home, let employees work at staggered peak hours, reduce work hours, and cancel or postpone conferences and large meetings. These can help employees avoid COVID-19. What government can do are close the school or let students taking online lessons, publicity information about COVID-19, provide medical resources for people. These are some suggestions can help people to prevent COVID-19. The core of these methods is keep away from other people, and this is a good way to prevent COVID-19.

These are some details on how to prevent COVID-19. Overall, the most important thing for people is wearing masks and paying attention to personal hygiene. Following these suggestions can have greater chance of not getting infected by COVID-19.

6. Comparison of novel coronavirus mutant strains

SARA-COV-2 caused a disease called COVID-19. It spreads very quickly and very easy to get infected. If a person who get COVID-19, then the respiratory symptoms caused by COVID-19 are like a cold, flu, or pneumonia [13]. COVID-19's incubation period is usually around two to fourteen days, and most

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people's symptoms of infection are very mild, however, some people might get very severe symptoms of infection. Also, after getting COVID-19, some people might have some Post-COVID Conditions, which also means "Long COVID" [13]. As time goes, in the 2020, there are some variants appears in the world, some of them were more aggressive.

6.1. Variant: Alpha (B.1.1.7)

The Alpha (B.1.1.7) is the first variant of the COVID-19 varus. The Alpha (B.1.1.7) found in the 2020, November in the United Kingdom, in the 2020 December, a surge in the infections [14]. In 2021 February, the Alpha variant became the major variant in the United Kingdom. The Alpha variant spreads faster than original virus which is SARA-Cov-2. Scientists believe the Alpha variant can cause 30% to 50% more contagious than the SARA-Cov-2 [15]. Also, the Alpha variant can cause higher death rates and quickly spread to other 189 countries [14]. However, this Alpha variant disappears after 2021 September.

6.2. Variant: Beta variant (B.1.351)

The Beta variant (B.1.351) was first found in South Africa, then become the major variant at the end of 2020. The CDC claims that the Beta variant (B.1.351) was around 50% more than contagious than the original SARA-Cov-2. 63.4% of people had severe disease and 28.8% death rate. However, when people get the Beta variant (B.1.351), this kind of variant had less replication than the original virus SARA-Cov-2 and the Alpha (B.1.1.7) variant [14].

6.3. Variant: Delta variant (B.1.617.2)

Delta variant (B.1.617.2) is a brand-new variant found in India in the October, 2020. The Delta variant (B.1.617.2) is an advanced version of the previous Alpha (B.1.1.7) and the Beta variant (B.1.351). Twice as many people are infected with the Delta variant (B.1.617.2). The Delta variant (B.1.617.2) infectious is higher than Beta variant, which causes 80% to 90% contagious. If someone didn't get vaccine before, then the Delta variant (B.1.617.2) can cause more severe disease [15]. Thus, the United States governments suggest people should get COVID-19 vaccine as soon as possible, and doing something such as wearing masks to protect themselves.

6.4. Variant: Omicron

Since these two years, the Omicron was the major variant spread around the world. Scientists found Omicron in November 2021, in South Africa. People are more likely to be infected with the Omicron. In December 2021, five continents and least 77 countries found the Omicron [16]. Also, the Omicron spread rate is higher than other kinds of variants. However, the Omicron has less severe symptoms than other variants. This means the Omicron didn't cause a huge impact on the human [16]. The death rates for people who get Omicron were decreasing.

Thus, according to the above variants, although the original virus SARA-Cov-2 keep variation and spread, but the variant sever for human is get decreasing. This is caused the COVID-19 to seem to disappear in the world. As vaccine development, people can get vaccine to protect themselves better.

7. Conclusion

This article mentioned the many details of COVID-19, such as the COVID-19 structure, spread ways, prevention, many different variants, and the development of the vaccine. Also, this article shows the people experience in the prevention of COVID-19, researchers' many new research results, such as many different types of vaccines from many different companies, and the advances in medical technology. However, this article didn't mentions that the details for the vaccines and how does researchers studied and developed the vaccine for the COVID-19, and this article didn't gives much COVID-19 data for each country very detail during the COVID-19 period. Today, COVID-19 is not a big problem anymore, from 2019 to 2024, everything has improved. In the future, medical technology will improve a lot, because medical technology always improving.

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