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Research Article

Pandemic Impact on Population Structure

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Abstract

The victims of the first wave of the pandemic caused by the coronavirus *Covid-19* were tens of millions of people in the population inhabiting the Earth. A previously unknown strain of *Covid 19*, which has a specific affinity for lung tissue and high contagiousness, has demonstrated a global danger to the life of the population of the entire planet. The pathogenicity of the virus is due to a three-segment structure, in which the RNA-containing segment, which is a pathogenicity factor responsible for specific lesions, most likely has an enzymatic nature.

Keywords:
coronavirus; RNA-containing segment; Pandemic

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Introduction

Population

Modern biological science considers a population as a structural unit of a species and an evolutionary process. The main criteria of the population are the number and structure. Population size is influenced by such factors as mortality and birth rate. These are the main processes, the ratio of which determines whether the population will increase, decrease or remain stable. An extremely important role in shaping the structure and size of the population is played by the factor of ecology [1].

English economist and philosopher Thomas R. Maltus (1766-1834), studying the laws of the demographic process, created a theory according to which the growth of the human population occurs exponentially, while the accumulation of food resources is subject to a linear relationship [2].

In a later historical period, the prediction of the size of a human population began to be studied from the point of view of the hyperbolic law of growth [3].

Ecological Catastrophes

Evidence of such a rapid growth of population on planet Earth can be an increase in the population from 2 to 7 billion in 70 years after the end of the 2nd World War.

The post-war demographic explosion of the population was accompanied by a change in the qualitative composition of the population and renewal of its structure. A functionally active role in society began to fall on the shoulders of the younger generation. The main engine of scientific and technological progress in society has become intelligence, based on knowledge acquired at universities. As a result of the development of highly efficient technological schemes, civilization has been enriched with modern industry and new types of energy. At the same time, it has been established that about 6 billion tons of CO 2 enter the Earth's atmosphere annually by man-made routes. The ecology of planet Earth is facing the problem of global warming and climate change: an ecological crisis has become inevitable [4]. The changing environmental factor is already beginning to affect the population of some animal species, especially in the Arctic and Antarctic zones.

It is difficult to assess the damage caused to the human population from disasters at nuclear facilities such as Chelyabinsk-40 (1957), Chernobyl (1986), Fukushima (2011).

In the middle of the 20th century, a revolutionary event in the field of biological science was the discovery of the double-stranded structure of DNA [5]. It outlined the path to deciphering the genetic code of the heredity of living organisms. Genetic engineering has become available to researchers who want to manipulate the properties of microorganisms.

The idea of obtaining highly active pathogens by genetic engineering was picked up by specialists developing bacteriological weapons. Despite the prohibition by the UN, in countries with authoritarian (totalitarian) regimes, such as the USSR, China, North Korea, Iran, the accumulation of highly dangerous pathogens continued [6]. The use of military aerosol preparations containing anthrax spores was found by Arab terrorists who committed in September 2001. attack on the USA [7]. An example of an acute epidemiological situation can be an outbreak of anthrax at a military facility, which claimed more than 100 human lives (Sverdlovsk 1979).

Epidemics and Pandemic Caused by Covid-19 Strain

History knows the terrible epidemics of plague, cholera, smallpox that struck the population of Europe during the Middle Ages. They ended with a huge number of human victims, the memory of which today is preserved by monuments erected in large cities such as Vienna, Geneva, Munich and others, as well as dozens of tombstones in the squares of small towns throughout Europe. As a result, these epidemics were defeated with the help of appropriate sanitary and hygienic measures and effective vaccine preparations developed by scientists.

The civilization of the twentieth century was subjected to no less dangerous infection with influenza virus (Influenza epidemic 1918-1919), which infected 1/5 of the world's population. Among the sick, the death rate exceeded 20 million people [8].

The scale of the impending environmental threat from the climate turned out to be incomparable with the sudden danger to the lives of people on planet Earth, which was brought by the coronavirus, previously unknown to science and medical practice. The catastrophically rapid spread of the deadly virus around the world forced WHO in March 2020 to declare the epidemic situation a pandemic.

A study of the history of the origin of the *Covid-19* virus has shown that its closest ancestor may be *SARS-CoV-2*, a beta coronavirus. This virus is more distantly related to 3 *RaTG1* and *RmYN02* viruses that were obtained from bats in 2013 and 2019, respectively, in Yunnan, China [9].

For the first time, a strain of *Covid-19* was registered in December 2019 (at a distance of more than 1,000 miles) in the city of Wuhan, (Hubei Province, China). An epidemic of a pneumonia-like disease that broke out in the city was carefully concealed by the authorities, which only contributed to the uncontrolled spread of the virus among the population. When this causative virus got into the laboratory of the Wuhan Virus Institute and became the subject of experimental development, the question remains open. However, one possible explanation for the release of the deadly virus into the environment comes down to the assumption of a security breach at the Wuhan laboratory. It is possible that the first cases of the disease with the pneumonia syndrome were found in the laboratory staff. Despite the obvious danger, they apparently neglected the conditions of isolation and continued to lead a normal life. As a result of visiting the seafood market, buyers became infected through direct contact with patients with the virus. The beginning of a mass epidemic among the local population was laid. The fact that market visitors were infected with the virus prompted the authorities to blame bats as the source of the virus [10,11].

Coronavirus strain *Covid-19* turned out to be highly contagious and began to spread throughout the planet with incredible speed. Measures for the movement of people by various means of transport, the closure of interstate borders, the introduction of strict sanitary and hygienic rules such as quarantine, protective masks and individual isolation - all this could not stop the aggressive advance of the coronavirus across all continents of the planet. Pharmacology was powerless against a viral pandemic.

There are not enough statistics to single out a certain age group that is most susceptible to infection with coronavirus. However, practical medicine in some countries believes that elderly patients (75-80 years old) come to the clinic with a diagnosis of coronavirus infection much more often. It appears that children under the age of 12 are less susceptible to the effects of the *Covid-19* coronavirus. According to the WHO, which announced the start of a pandemic in March 2020, over a six-month period, more than 30 million people were infected with the coronavirus worldwide, and more than 1 mln died.

Formula of Pathogenicity of Coronavirus Covid -19

The *Covid-19* coronavirus particle is a complex macromolecular structure consisting of three segments. The surface of the particle is covered with a lipid-peptide layer, which plays the role of specific protection. The genetic material (genome) encoding the biosynthesis of proteins after the virus enters the cell is enclosed in an *RNA*-containing segment. The third segment is a protein component synthesized in the cell after the penetration of the virus particle into it and the introduction of RNA into the cell genome [12].

It can be assumed that the lipid component, in addition to the protective role, also performs an adhesive function. He takes part in the binding of the viral particle to the surface of the mucous membrane of the respiratory tract. This binding does not have the character of a strict specific ligand-receptor interaction, but is carried out through a simple ion-ion contact. A slight violation of the physico-chemical balance can explain the global spread of the virus in the environment.

Like lipid A of Gram-negative bacteria, coronavirus lipid does not have antigenic properties, i.e. does not induce an antibody response of the immune system. It follows that there is no reason to expect an antibody response to the viral lipid in patients who have had a corona virus infection [13].

A specific role in the binding of the viral part to the target cell, apparently, is played by the protein component of the lipid-peptide structure. This component enters into a ligand-receptor interaction with the corresponding receptor on the cell surface.

Analysis of the sequence of nucleotide bases in the RNA genome, a segment of the Covid-19 strain, revealed a modification compared to the genome of the progenitor natural coronavirus SARS Cov-2. This modification, apparently, determined the high degree of pathogenicity of the *COVID-19* strain.

The third segment, which is a protein synthesized after the fusion of the virus RNA with the genome of the lung tissue target cell, has the function of a damaging factor. And although the biological activity of this pathogenicity factor has not yet been established, it can be assumed that it has the properties of collagenase. Collagenase activity is evidenced by blood clots thrombosing the blood vessels of the lung tissue of the deceased.

In addition to symptoms of a respiratory and cold-like nature, clinical patients infected with *Covid-19* experience damage to the nervous system, accompanied by hypoxemia [14].

According to German authors, sensitivity to *Covid19* coronavirus disease depends on the state of the patient's immune system. Clinical observations have shown that the severity of the disease increases in the case of an overactive immune system of the patient [15].

A study by Italian doctors of pathological materials from 50 patients who died with a diagnosis of coronavirus infection showed the absence of lesions in the lungs characteristic of bacterial pneumonia. Instead of destroying lung tissue cells, blood vessels and capillaries were filled with blood clots. Blood clots prevented the circulation of oxygen in the lungs, which caused a lethal effect. The conclusion of Italian doctors confirmed the fallacy of treating coronavirus infection with methods suitable for bacterial pneumonia [12,16].

So far, there is no convincing data on the presence of protective immunity in patients who have had a coronavirus infection. However, isolated cases indicate the presence of a weak immune response to a primary infection caused by *Covid-19*.

Forecasts and Reality

In the first months of the pandemic, experts studying the patterns of development of epidemic processes argued that a pandemic caused by a strain of *Covid-19* could last up to two years. In fact, the development of vaccine preparations, which was carried out in the world's reality laboratories and took place in an atmosphere reminiscent of the "arms race" of the Cold War period, greatly softened the forecast. Incompetent politicians were eager to prove the superiority of their country in saving humanity from the coronavirus plague. To date, the health services of many countries have effective vaccines to prevent *Covid-19* infection.

In some countries of the world where the pandemic has subsided, WHO notes the resumption of the second wave of the pandemic. It seems that those who have recovered from *Covid-19* do not have post-infection immunity, or a new strain of the virus is involved in the second wave. In connection with the new wave of the pandemic, WHO predicts an impending catastrophe, which will undoubtedly affect the structure and size of the population, as well as the economic and social progress of the community as a whole.

As of 25 July 2022, according to WHO, there are 10566,977,818 confirmed cases of Covid-19 worldwide, including 6,376,503 deaths [17].

Conclusion

After almost 2 years of the pandemic, the inadequacy of administrative and organizational measures in the fight against coronavirus *Covid-19* infection was revealed. Such a strategy failed to stop the spread of the pathogenic virus among the population of the planet. A radical change in the course of the pandemic occurred as a result of mass vaccination of most of the adult population of the planet.

Nevertheless, it can already be said now that the pandemic has left a severe psychological trauma in the minds of the entire human race. Undoubtedly, the consequences of the pandemic will affect not only the size of the population, but also the well-being and well-being of the population as a whole.

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