Nat. Volatiles & Essent. Oils, 2021; 8(4): 7430-7440

NVEO
Natural Volatiles &
Essential Oils

Experience And Results Of Vaccination In The Republic Of Uzbekistan

Yusupaliev B.Q. , Kurbanov B.J. , Anvarova L.U. , Abduraximova Z.K. , Karimov A.A.

Sanitary-epidemiological welfare and public health service

Keywords: corona virus, SARS-CoV-2, COVID-19, pandemic, vaccination, prophylaxis, immunoglobulin, antibody, PCR.

The urgency of the problem. Vaccine management of epidemics of infectious diseases is currently the most reliable prophylactic method of combating the epidemic. The use of vaccines not only helps to prevent the spread of the disease, but also to prevent the spread of the disease to the specific part of population that has contraindications to vaccination. According to the WHO, the COVID-19 pandemic has so far killed nearly 5 million people [1, 2, 6].

The virus continues to spread around the world. The coronavirus vaccine is the most important tool in ending the pandemic, saving lives and achieving economic stability. In more than 190 countries around the world, the population has been vaccinated against COVID-19 in almost 6 billion doses. However, the level of vaccination in countries around the world varies greatly.In highly developed countries, the amount of vaccines per capita is twice as high as in developing countries. The slower the rate of vaccine use, the longer the virus will circulate and develop, and the greater the social and economic damage to countries. The WHO aims to vaccinate at least 40 percent of the population in each country by the end of this year, and to increase this figure to 70 percent by 2022 [3-5].

At the beginning of 2021, more than 7 vaccines developed on 3 technological platforms around the world began to be used. In addition, the production of more than 200 vaccines is underway, at least 60 of which have reached the stage of clinical research. At this stage, the selection and widespread use of safe and highly effective vaccines for the population is one of the most pressing issues [3, 4].

Taking the above into account, a study was conducted to determine the effectiveness of vaccines used in the Republic of Uzbekistan.

The purpose of the study. To study the effectiveness of vaccines used in Uzbekistan.

The object of research. A total of 1,774 individuals participated in the special experiment. Out of these, 1,357 (76.5%) were vaccinated against Covid-19, and 417 (23.5%) were not vaccinated.

The experiment participants were distributed according to the type and dose of vaccine they received.

Table 1. **Distribution of experiment participants according to the type and dose of vaccine received**

ZF UZ VAK			**Astrazeneca**		**Sputnik-V**		**Total**
1st dose	2nd dose	3rd dose	1st dose	2nd dose	1st dose	2nd dose	
281 (35,4%)	274 (34,5%)	238 (30,1%)	72 (16,9%)	352 (83,4%)	94 (67,1%)	46 (32,9)	1357 (100%)
793 (58,4%)			424 (31,2%)		140 (10,4%)		

The number of women in the experiment was almost 3 times higher than that of men. This is due to the high activity of women in the population against the vaccine and the large number of women in the study.

Table 2. Gender distribution of experiment participants according to the vaccines they received

Not vaccinated (n=417)		**ZF UZ VAK (n=793)**		**Astrazeneca (n=424)**		**Sputnik-V (n=140)**	
male	female	male	female	male	female	male	female
94 (22,5%)	323 (77,5%)	138 (17,4%)	655 (82,6%)	106 (25,0%)	318 (75,0%)	39 (27,8%)	101 (72,2%)

The average age of the experiment participants was proportional in all groups.

Table 3. Age distribution of experiment participants according to the vaccines they received

Total (n=1774)	**Not vaccinated (n=417)**	**ZF UZ VAK (n=793)**	**Astrozeneca (n=424)**	**Sputnik-V (n=140)**
46,77±2,19*	44,9±3,48*	47,05±2,49**	44,24±0,16***	50,89±5,11

*P<0,25; **P<0,1; ***P<0,01

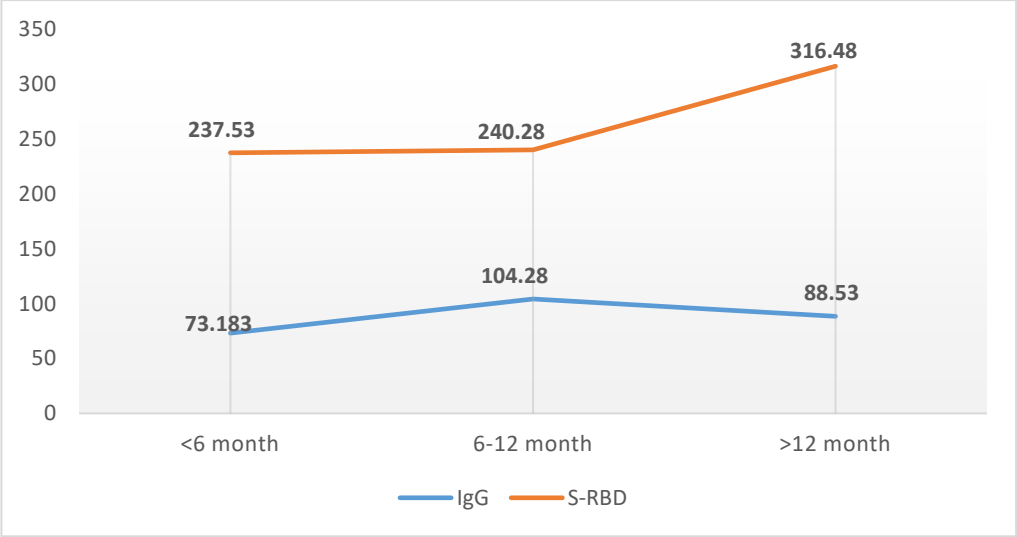
Testing methods. To assess the change in antibodies over time in different groups, IgG and S-RBD protein antibodies on the surface of the virus were tested at different times. All serological tests were performed on an automated chemiluminescentimmunoanalyzer MAGLUMI 2000 (China) using the IXLA method. IgG MAGLUMI was detected in 2019- nCoV IgG test systems.

Research results.

Changes in the amount of antibodies over time in unvaccinated and vaccinated individuals.To assess the dynamics of antibody formation after infection in unvaccinated individuals, all test results were

divided into analysis with a history of COVID-19 from 6 months, 6 to 12 months, and more than 12 months. The analysis revealed that the amount of IgG generated after infection did not exceed 105 units and remained virtually unchanged for more than 1 year. It was also observed that the amount of antibodies against the S-RBD protein on the surface of the virus did not exceed only 240 units, only slightly increased more than 1 year after infection.

Figure 1. Changes in antibodies formed at different times after infection in unvaccinated individuals (n = 417), BAU



The post-vaccine immune response was analyzed at 2-3 week intervals (1–14 days; 15–28 days; 29–60 days; after 60 days). The change in IgG levels was almost the same in vaccinated individuals. It was observed that IgG increased in the first weeks after vaccination, regardless of the type of vaccine. Immunoglobulin levels decreased after 2 months when the vaccines were given in a single dose (Figures 2-4).

Figure 2. Changes in IgG levels after astrazeneca vaccine (n = 424), BAU

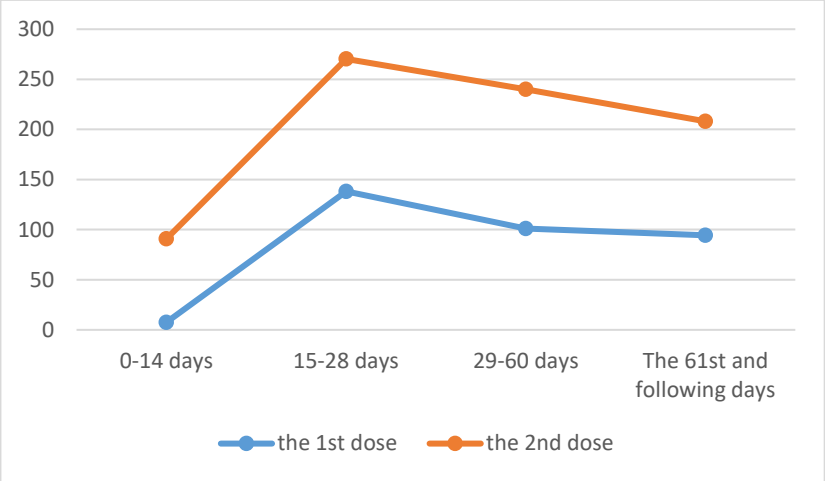
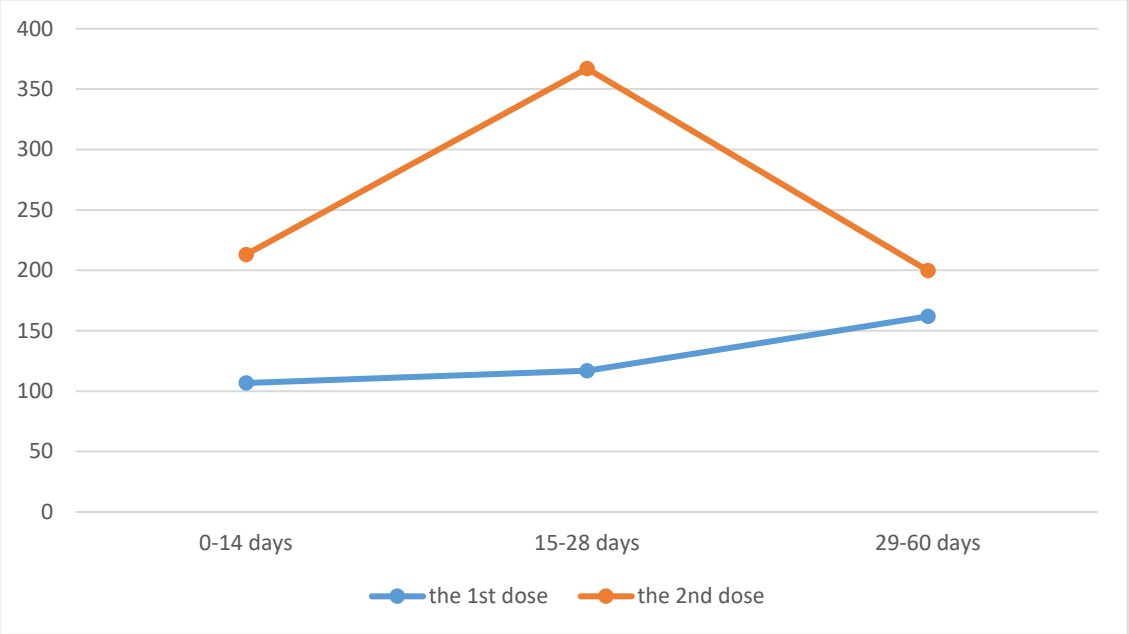
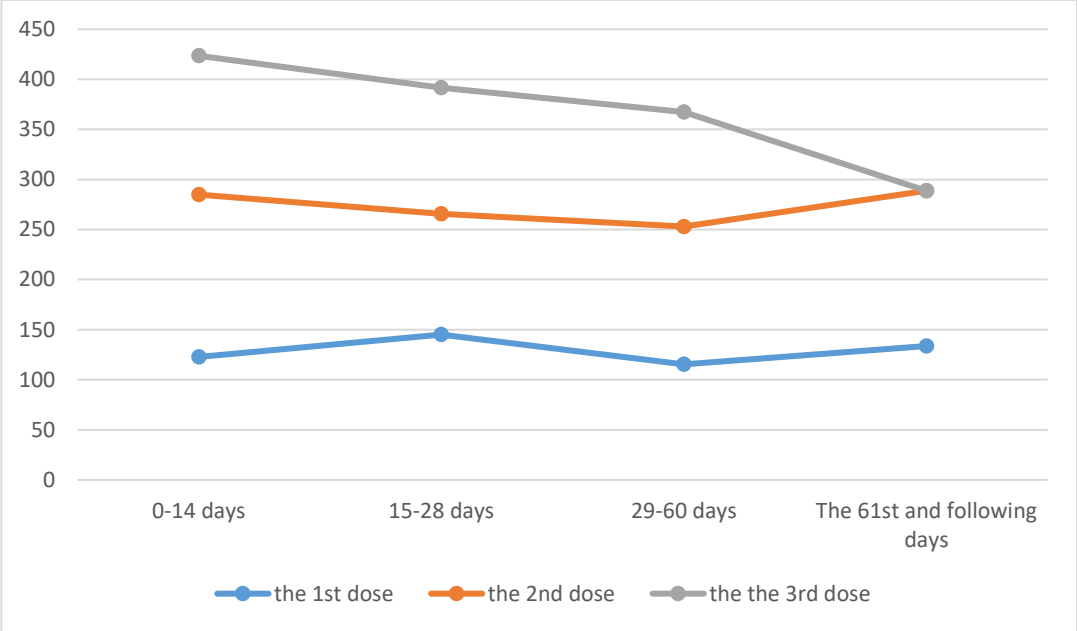


Figure 3. Changes in IgG levels after Sputnik-V vaccine (n = 140), BAU



The picture after the ZF UZ VAK vaccine was similar to that of other vaccines, with IgG levels stable in those vaccinated at three doses for 2 months (Figure 4).

Figure 4. Changes in IgG levels after ZF UZ VAK vaccine (n = 793), BAU



Examination of the amount of antibodies against the S-RBD protein on the surface of the virus showed that antibodies appeared at high rates in response to all vaccines and increased linearly for 2 months after vaccination. This was especially evident after the Sputnik-V vaccine. The most important aspect of antibodies to the S-RBD protein after vaccination is that the degree of these antibodies is several times higher than the IgG degree and continues to increase for several months after vaccination. (Figures 5-6).

Figure 5. Changes in S-RBDab levels after astrazeneca vaccine (n = 424), BAU

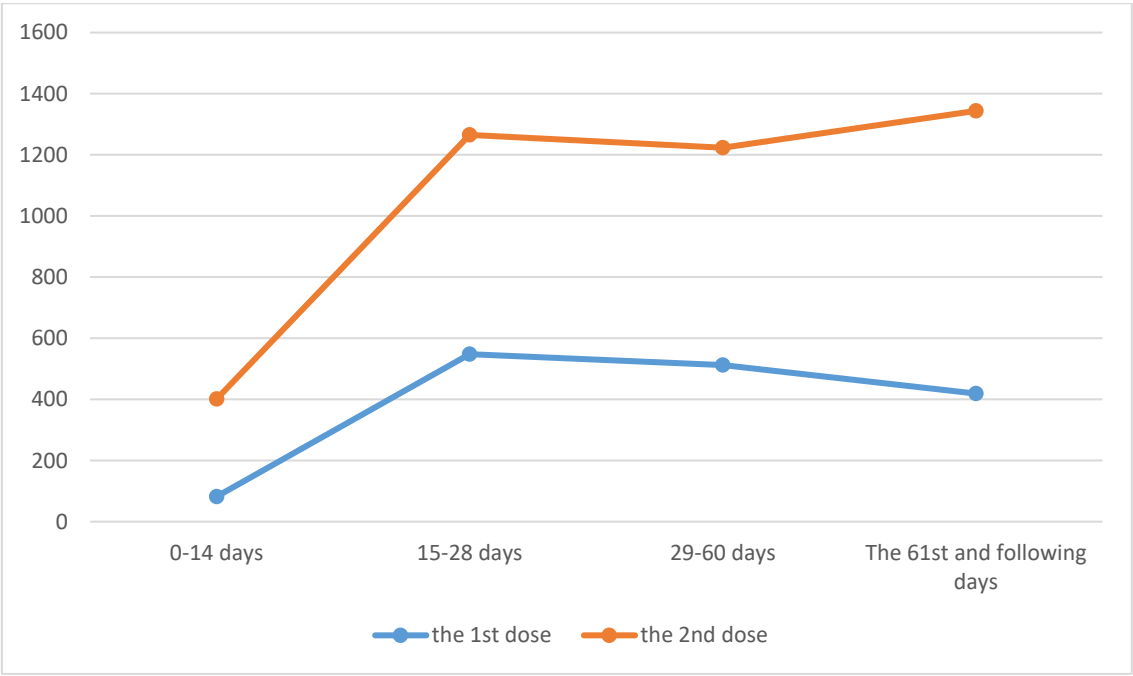
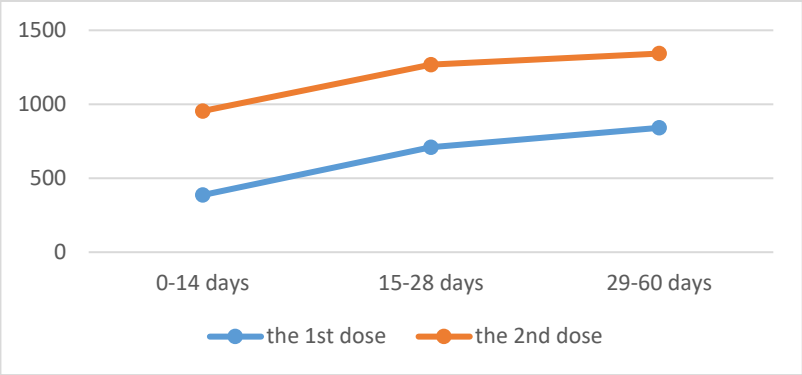
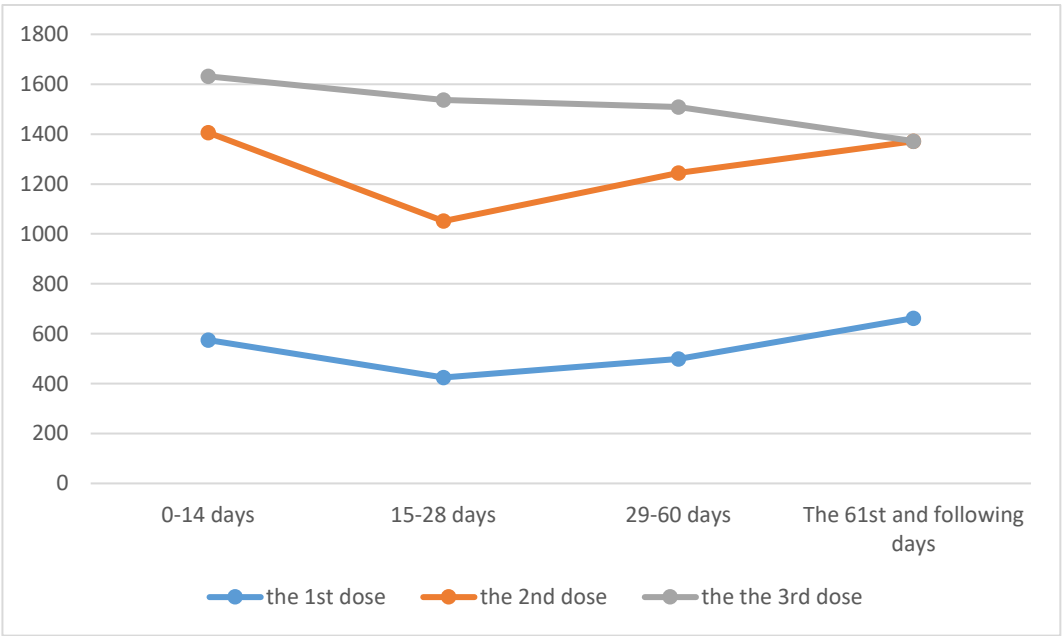


Figure 6. Changes in the amount of S-RBDab after Sputnik-V vaccine (n = 140), BAU



As mentioned above, the ZF UZ VAK vaccine has shown its competitiveness with other vaccines in this regard. That is, the amount of antibodies against the S-RBD protein on the surface of the virus was at least 3 times higher than the IgG degree, which increased further over time.

Figure 7. Changes in the amount of S-RBDab after vaccination ZF UZ VAK (n = 793)



Due to the fact that the amount of antibodies in the blood of the study participants was very wide and the degree of antibodies was higher than 1000.0 units, the laboratory provided the result in the form "> 1000.0":

Degree - in the range of 0 - 1.0 units;

Degree - in the range of 1.01 - 100.0 units;

Degree - in the range of 100.01 - 1000.0 units;

Degree - IgG above 1000.0 units;

Similarly, antibodies against the S-RBD protein on the surface of the virus were divided into 4 groups:

Degree - up to 3.0 units;

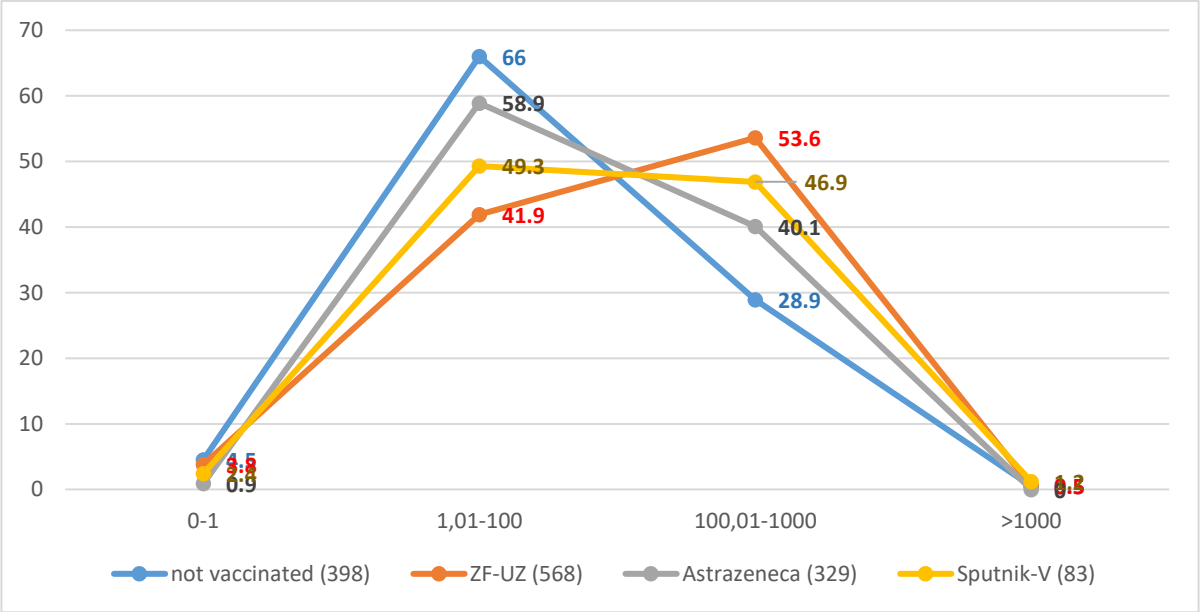
Degree - in the range of 3.01 - 100.0 units;

Degree - in the range of 100.01 - 1000.0 units;

Degree are antibodies to S-RBD protein above 1000.0 units.

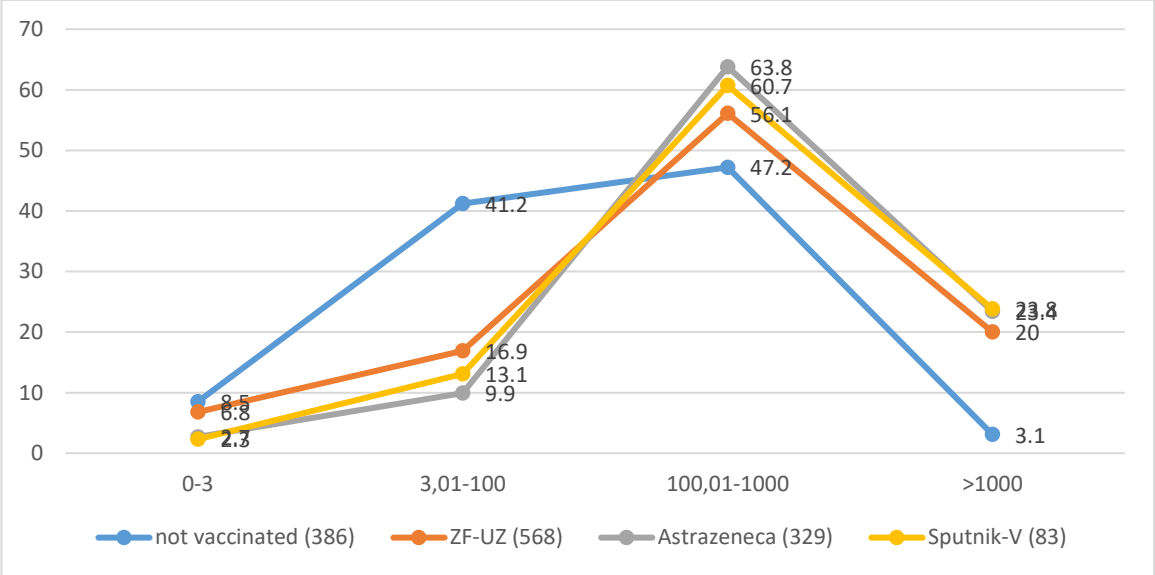
Analysis of IgG levels showed that the majority of those vaccinated with any vaccine had an IgG degree of 1.01-1000.0 units, but the results with a degree of 100.01-1000.0 were significantly lower than those who were vaccinated (Figure 8).

Figure 8. Frequency of different IgG degrees developed in response to disease and vaccination of study participants (n = 1357),%.



Furthermore, in more than 50% of the subjects, the amount of antibodies to the S-RBD protein was in the range of 100.01-1000.0 units, while in non-vaccinated 100.01-1000.0 degree results were less than 10%. However, among those vaccinated, those with a S-RBDab degree greater than 1000.0 units were more than 20% regardless of the type of vaccine, and antibodies of this degree were observed in only 3.1% of those who were not vaccinated (Figure 9).

Figure 9. Frequency (n = 1357) of different degrees of S-RBDab developed in response to disease and vaccination of study participants,%.



Formation of antibodies in response to different doses of vaccines received.

When the dependence of the amount of antibodies on the dose of the vaccine was studied, it was found that the majority of those vaccinated with only 1 dose of any vaccine produced an IgG degree of 1.01-100.0 units. Only 75% of those who received the ZF UZ VAK vaccine once had IgG levels in the range of 100.01-1000.0 units. However, those vaccinated in 2 doses, and in the ZF UZ VAK vaccine, and those vaccinated in 2 and 3 doses, after the second and third doses, the number of antibodies to 1.01-100.0 and 100.01-1000.0 degrees was equal, ie the number of revaccinated antibodies increased. led to an increase, while the number of antibodies detected in the amount of 1.01-100.0 decreased, and the number of individuals with an amount of more than 100.01 increased.When this condition is compared with the above data, it is reasonable to assume that repeated vaccination will prevent the elimination of antibodies in the body and help maintain a stable immunity. The change in the dose of S-RBD antibody against the vaccine gave a similar result (Figures 10-11).

Figure 10.. Frequency of occurrence of different IgG degrees generated in response to different doses of vaccines, (n = 1357),%.

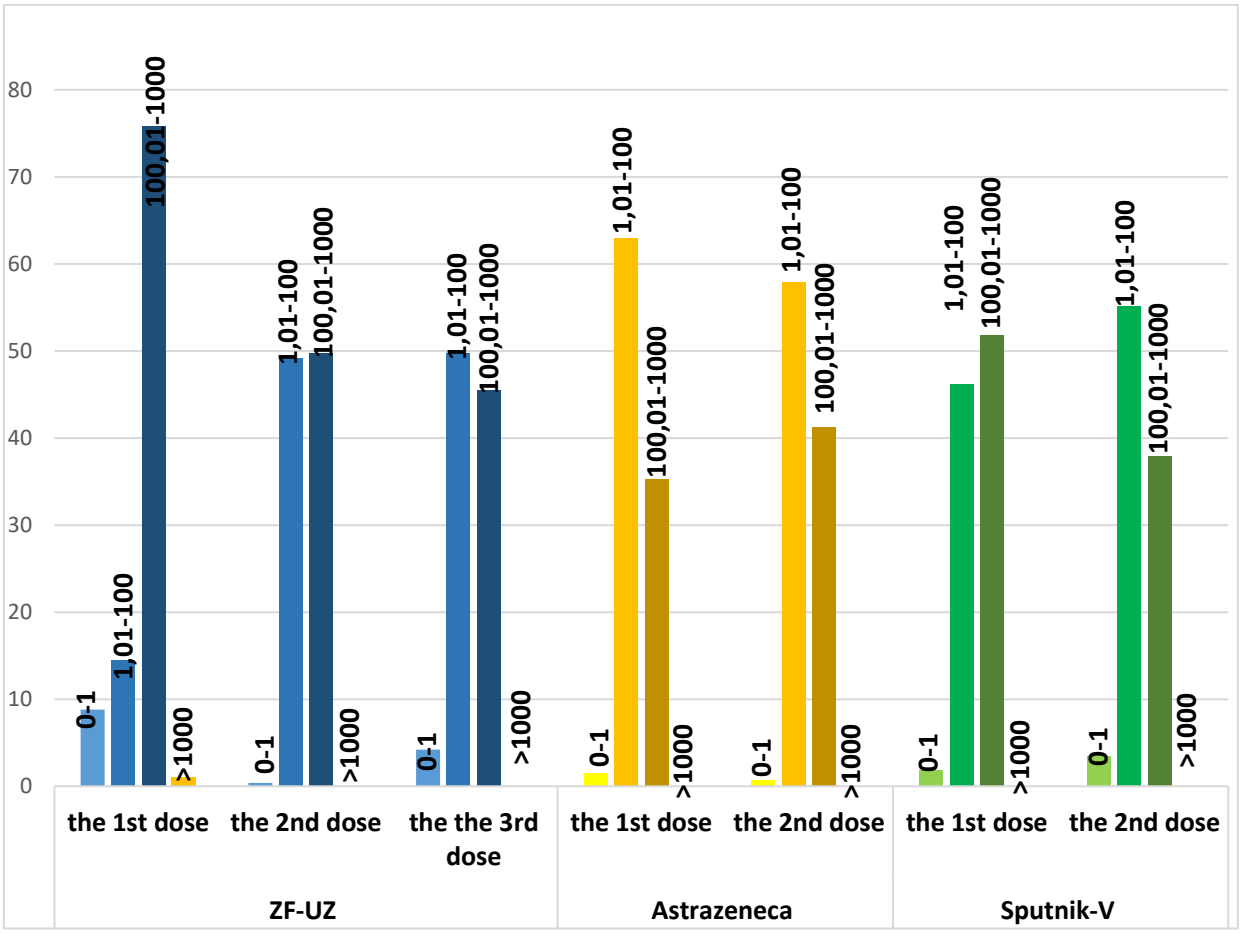
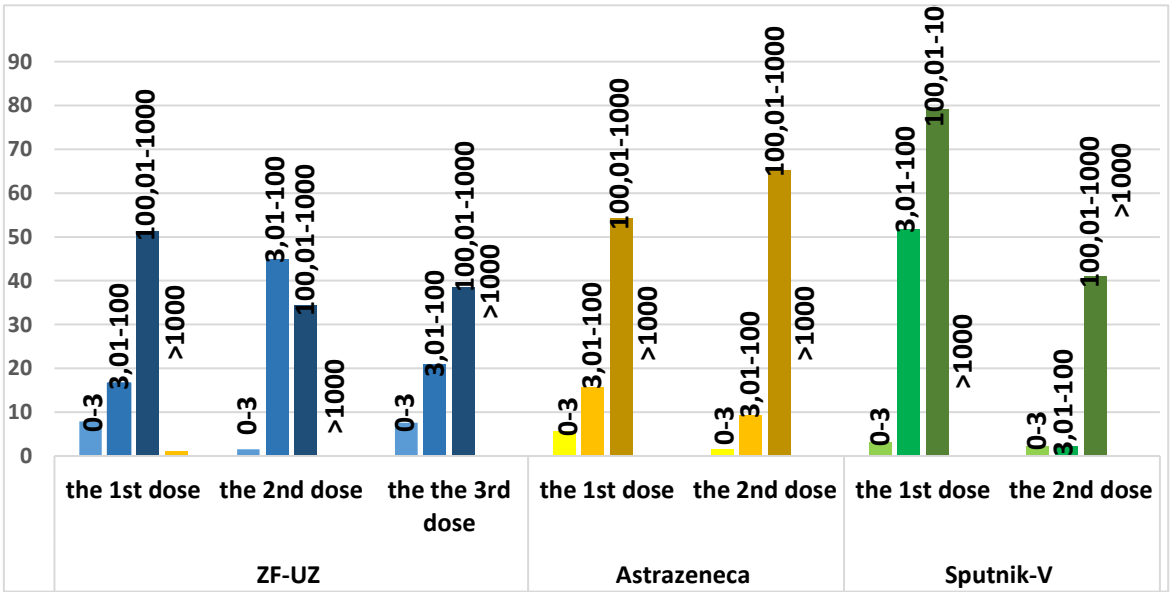


Figure 11. %.Frequency of occurrence of different degrees of S-RBDab formed in response to different doses of vaccines, (n = 1357),%.



It should be noted that the immune response caused by Astrazeneca, Sputnik-V vaccines was similar to the production of antibodies when vaccinated with ZF UZ VAK vaccines, and the results were proportional.

CONCLUSION.

In individuals who have experienced coronavirus disease and have not been vaccinated, the immune response develops very slowly and has low rates.

Regardless of the type of vaccine, the change in IgG levels is almost the same in vaccinated individuals.

The condition after ZF UZ VAK vaccine is similar to that of other vaccines, the IgG level increases after the 2nd dose of the vaccine, and the IgG level remains stable for 2 months after vaccination after the 3rd dose.

The amount of S-RBD protein antibodies on the surface of the virus was high in response to all vaccines, and a linear increase was observed within 2 months after vaccination.

The results of the analysis showed that repeated vaccination prevents the elimination of antibodies in the body and helps maintain a stable immunity.

It has been observed that the ZF UZ VAK vaccine helps to maintain the high production of antibodies against the S-RBD protein on the surface of the virus.

Studies have shown that the ZF UZ VAK vaccine helps to develop antibodies that can compete with vaccines recognized by the World Health Organization, which are approved for emergency use, in the formation of an immune response to COVID-19.

Further scientific research and studies are being carried out.

References:

1. Джафарова Х.Г., Тагиева Ф.Ш. Мировая борьба с пандемией COVID-19// Материалы международной научно-практической онлайн конференции, посвященной году «Поддержки молодёжи и укрепления здоровья населения» - Фергана,2021.-С.23-26.
2. Касымов И.А., Шаджалилова М.С., Шомансурова Ш.Ш. Клинико-эпидемиологические особенности и профилактика коронавирусной инфекции// Методическое руководство. - Ташкент,2020. 16 с.
3. Мирварисова Л. Т., Нурмаматова К. Ч., Мирзарахимова К. Р. Медицинский менеджмент, оптимизация и совершенствование системы здравоохранения в Узбекистане //Stomatologiya. – 2018. – №. 4. – С. 61-64.

4. Кутырев В.В., Попова А.Ю., Смоленский В.Ю., Ежлова Е.Б., Демина Ю.В., Сафронов В.А., Карнаухов И.Г., Иванова А.В., Щербакова С.А. Эпидемиологические особенности новой коронавирусной инфекции (COVID-19). Сообщение 1: Модели реализации профилактических и противоэпидемических мероприятий // Проблемы особо опасных инфекций. - М.,2020. -№1.-С.6-13.
5. Пшеничная Н.Ю., Веселова Е.И. COVID-19 – Новая глобальная угроза человечеству // Журнал Эпидемиология и инфекционные болезни.-М.,2020. -№1.-С.11-13.
6. Mirvarisova L. T., Nurmamatova K. H., Mirzarahimova K. R. Medical management, optimization and improvement of the health system in Uzbekistan //Journal of Dentistry.–Tashkent. – 2018. – №. 4. – С. 61-64.
7. Улмасова С.И., Касимов И.А., Шомансурова Ш.Ш. Законодательные основы системы профилактических и противоэпидемических мероприятий против COVID-19 в Республике Узбекистан // Материалымеждународной научно-практической онлайн конференции, посвященной году «Поддержки молодёжи и укрепления здоровья населения» - Фергана, 2021.-С.168-176.
8. Mamatqulov, B. M., Mirzarakhimova, K. R., Urazaliyeva, I. R., Avezova, G. S., & Mirakhmedova, S. S. (2021). Risk Factors for Congenital Anomalies in Children and the Role of the Patronage Nurse. Annals of the Romanian Society for Cell Biology, 8803-8815.
9. Forster P., Forster L., Renfrew C., Forster M. Phylogenetic network analysis of SARS-CoV-2 genomes. Proc. Natl. Acad. Sci. USA. 2020; 117 (17).