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ORIGINAL ARTICLE **OPEN ACCESS**

Assessment 0f The Dynamics of Humoral Immunity Formation When Vaccination A Group of Children with The Bnt162b2 Vaccine (Pfizer–BioNTech) against Covid-19 Infection

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ABSTRACT

To evaluate the dynamics of formation and duration of maintenance of humoral immunity after administration of the 1st and 2nd doses of the BNT162b2 vaccine (Pfizer-BioNTech) in a group of children. Materials and methods. The research work used the results of the analysis of blood serum samples from 205 children in family clinics No. 16. Vaccine efficacy against SARS-CoV-2 was assessed in a retrospective population-based analysis using epidemiological, serological and statistical methods. Results: The results showed that IgM-Ab against SARS-CoV-2 was detected in 100% of cases on the 21st day after administration of the 1st component of the vaccine in the blood of vaccinated children (average positivity rate - 4.94), on the 30th day there was a natural decrease in the amount of IgM against SARS-CoV-2 (average positivity rate - 0. Conclusion: It is worth noting that on the 21st day of vaccination a significant decrease in IgM levels was detected, and on the 51st day these indicators leveled off. On the 21st day after vaccination with components 1 and 2, a direct positive correlation was revealed between the amount of IgM and IgG from 0.69 to 0.29 (r<0.05
Key words: *COVID-19 infection, prevention, vaccine.*

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INTRODUCTION

The use of safe and effective vaccines worldwide in equitable miqia has served as an important factor to end the COVID-19 pandemic, which was achieved with the production of new vaccines and numerous clinical trials[14]. Currently, the WHO is encouraging many country scientists to cooperate in the development of safe and effective vaccines and the implementation of collaborative work on this. But what is noteworthy is that from a pandemic we are not saved by vaccines, but by a fair and effective vaccination process. It was seen as a priority issue in the world's Mica to carry out the vaccination process on an equal footing and effectively, to ensure that vaccines enter each country, and to start vaccination processes from the weakest segment of the population [1]. Currently, several vaccines have been produced that can fight COVID-19 and are aimed at preventing transmission, but they are all trying to achieve the same goal-that is, to form immunity to the virus, while some species can prevent (block) transmission to a living organism. They do this by stimulating immunity to the antigen, the malecula (S-protein) present in the viral shell [2]. It is worth noting that SARS-CoV-2 belongs to a group of viruses that store a single – stranded sensitive RNA molecule and is 89% (70% in some literature) from coronaviruses to SARS (SARS-CoV-2) [3], which is 82% similar to the human body'S RNA chain, is composed of a structure hos to all coronaviruses and can bind to the RNA genome via a nucleocapsid present in the Shell and call disease [4,5]. The entry of the virus into the body is achieved by recognizing the receptors present in the body and attaching human angiotensin-changing enzyme - 2 (ACE2) and S proteins [15]. There are currently data describing patients ' innate immunity to SARS-CoV-2. In a research study in Uhan (China), an analysis of about 100 patients showed an increase in the total number of neutrophils in the blood (38%), a decrease in the total number of lymphocytes (35%), an increase in the level of IL-6 (interleukin) (52%), an increase in the level of S-reactive protein (84%) [6]. Another research study has found that patients who have fully recovered from COVID-19 again have infection transmission (reinfection) [7] and this is a notable aspect that is given importance in the production of vaccines. Antibodies fight it when the Virus enters the body, but the virus has a receptor binding property (antibody-dependent enhancement) through which the virus can actively participate in pathogenelic processes in the body. Ultimately, a high effect is achieved in treatment measures based on the antibodies (nucleocapsid) present in the virus, knowing this mehanism [17] as can

be seen from the data above, the main way to protect against the virus is to vaccinate against it. The human body has a cell (humoral immunity) immune system that fights COVID-19. Reactions of T and B cells have been observed in the blood of COVID-19 patients, and SARS-CoV-2 CD4 + and CD8 + T cell response and SARS-CoV-2 virus-neutralizing (activity-lowering) antibodies have been studied in infected patients and vaccine recipients[20]. According to the results of the study, t memory cells are preserved in the body, but it is not clear how well functional T memory cells are reflected in the blood (not scientifically based). Furthermore, CD4+, CD8 + T in clinical blood samples cannot be evaluated by definition. With these in mind, methods for the formation and development of a certain memory of T cells are being studied after vaccination – for example, after immunization, T tissue can be developed in any tissue using cytokine and chemokine signs and made possible by changing the way of vaccination, affecting the creation of protective T cell memory [8]. In our Republic, two-component vaccine "Sputnik-V" has been widely used in vaccination processes. After vaccination with a vaccine, serum immunoglobulin G (IgG) levels increase and immunity against the virus is formed in the body[22]. Knowing the amount of antibodies in the blood, it is possible to assess how the body changes its immune advertising against the virus. Sputnik - V is a two-component vaccine against COVID-19 containing the coronavirus s-protein nature gene that produces antibodies. At the moment, several stages of vaccination are being carried out[21].

When organizing the vaccination process against the virus, attention is paid to the population layer, the vaccination process is recommended to be carried out initially in the risk groups of the population (in patients with obesity, diseases of the cardiovascular system, suffering from diseases of the respiratory system and those with diabetes mellitus). In cases of HIV, autoimmune diseases and the like, the effects of the vaccine on patients have not been fully studied, but vaccination is necessary after such individuals have been given the necessary information and recommendations if the vaccine is included in the category of recommended populations.[22] individuals who have previously contracted and recovered from the disease may be offered vaccines, but they must give way to other needy groups, taking into account the immunity present in their body (who.,2021). There are specific aspects that are paid attention to during the vaccination process. For example: to patients with various side diseases, the age composition of the population, the age limit, impossible aspects, etc. Vaccination with vaccines (Pfizer-BioNTech and Moderna) is not recommended if any of the COVID-19 vaccine contains severe or immediate manifestations of allergic advertising (CDC.USA). But since vaccines with different compositions are currently being produced, vaccination with another type should be considered. BioNTech, a US study found adequate amounts of breast milk antibodies following vaccination (Pfizer/BioNTech, Moderna) in nursing mothers, and or the amount of post-vaccination antibodies in pregnant and lactating women was equivalent to non-fetal women.

According to the newspaper, an employee of the Center "vector" of Russia, the level of antibodies in elderly people after vaccination against coronavirus was lower than in young people (Rossiyskoy gazete.,2021). According to Anna Popova (Rospotrebnadzor-Russia), in 10% of those vaccinated in the world's Mica, immunity to coronavirus is not formed (https://www.rbc.ru/rbcfreenews., March 17.2021). A research study was conducted at Islamabad tashhis centre (Pakistan) to determine the effect of the first dose of Sputnik – V vaccine. A cross-sectional (cross-sectional) research method was carried out over 2000 participants. The research work was carried out within 21 days after vaccination. Analysis work was carried out on special equipment (Electro-chemiluminescence immunoassay (ECLIA), taking samples from individuals who gave negative results to coronavirus. 85% of participants showed strong positive results against SARS-CoV-2's s - protein (1.5 AU/ml). Individuals with antitana titre > 250 AU/ml were 34.9%. The antithanasia rate is > 250 AU / ml of 52% of those who have previously been infected with COVID-19. > Participants with 100 AU / ml antibodies were 12.7%. But in 9.5% of the case, the antithello titre showed> 25 AU / ml. In 27% of participants, the antithello titer was > 1.5-2.5 AU / ml. An antitello titer of <1.5 AU / ml has been observed among 15.9% of participants. In conclusion, the level of antibodies after vaccination is an indicator that assesses the strength of humoral immunity [24]. Currently, since the vaccination process in the world's mica is carried out in groups of 5 years and above on children, there is not enough data on the vaccination process and the amount of antibodies after it. But the conduct of clinical and epidemiological analyzes on the assessment of the effect of vaccination of young children is an urgent issue facing scientists.There are several possibilities to vaccinate young children against COVID-19, preventing severe cases of illnesses. At the same time having social, physical, ruxial advantages, it ensures that children are not left out of school classes, causing the incidence of SARS-CoV-2 in the population not to spread among other groups of people and subsequently decrease. While the disease is usually milder in children than in adults, the nymph can cause various complications in children. Omicron variant (B.1.1.529) in the current epidemiological situation leading, it is important to vaccinate children aged 5-18 years. Assessment of the

dynamics of formation and duration of preservation of humoral immunity after administration of dose 2 of the pediatric team in case 1 of the vaccine BNT162b2 (Pfizer–BioNTech).

MATERIAL AND METHODS

In the research work, the results of taxable samples of mining serum of 205 children in 16 family polyclinics were used. In a retrospective population taxile using epidemiological, serological, statistical methods, the effectiveness of the vaccine against SARS-CoV-2 was evaluated.

7,158 of the 584,181 children living in Tashkent City were vaccinated with 2 doses of the vaccine, 205 children in 16 family polyclinics where the vaccine was carried out were taught karshi IgG to SARS-CoV-2 and anti-cancer (at) belonging to IgM class.

The verification process was carried out using a full-fledged automated chemiluminescent immunoanalyzer (medical equipment from Snibe (China)) of the MAGLUMI X3 series in an immunoxemiluminescent taxile (IXLT) method. IgM and IgG detection MAGLUMI 2019-nCoV was performed on IgM and MAGLUMI 2019-ncov IgG test-systems. For sampling, special test tubes with preservatives were used, the sample was placed in the refrigerator immediately and delivered to the bulgan laboratory with the appropriate license and certificate to carry out activities in the vehicle at a temperature of +2+8 degrees, and after the separation of the mining serum in this laboratory, IgM was checked for IgG in the serum.

RESULTS AND DISCUSSION

After the approval of the use of the WHO protocol–compatible vaccine BNT162b2 (Pfizer-BioNTech) for children from January 2022, 10 months later, as of November 15, 2022, 7,238 children (1.23%) of the 5-11-year-old 584,181 children living in Tashkent City in our study received 1 dose, 7,158 received 2 doses, children with buster dose were not vaccinated, 576,946 children not vaccinated.

During the study period, 3,981 children were diagnosed with COVID-19 infection among children, of which 12 had severe cases. (12 of the 56 children hospitalized were placed in the intensive care unit)

We started my study on November 15, 2022 children received 2 doses of the vaccine after 28 days after taking 1 dose of mRNA Lee BNT162b2 vaccine.

An assessment of seroprevalence in the population, studying the shelf life of antibodies in dynamics depending on the state of immunity distinguish groups with a high risk of infection re-infection first of all vaccination in Ham in order to determine the necessary infected contingents, a study was carried out against SARS-CoV-2 against SARS-CoV-2 in blood serum samples of 205 children The research work was carried out from November 2022 to January 2023.

A 2-step vaccine against COVID-19 was carried out,with all of the children in the study being soglom tested for the presence of SARS-CoV-2 genome and immunoxemiluminescent taxile (ixlt) AT in the blood in the polymerase chain reaction (PZR) method prior to vaccination. The investigation did not include SARS-CoV-2 virus RNA si in the upper respiratory tract and micdorium ixlt da s-RBD antigen epitope in the Pediatric Research guru anicized to antitana. Aniclase of antibodies to the S-RBD antigen epitope in mycdorium IXLT. The amount of At was evaluated in dynamics on the 21st day after the introduction of the 1st component of the vaccine and on the 14th day after the introduction of the 2nd component, on the 30th day in the 2nd month of the vaccine. The results showed that on the 21st day after the introduction of the 1st component of the vaccine in the blood of vaccinated children, IgM-At against SARS-CoV-2 was anicized in a 100% state (the average value of the positivity ratio is 4.94), and on the 30th day, a natural decrease in the amount of IgM was observed against SARS-CoV-2 (the average It is worth noting that on the 21st day of vaccination, a significant decrease in the indicators of IgM was found, and on the 51st day, these indicators were equal (Figure 1)

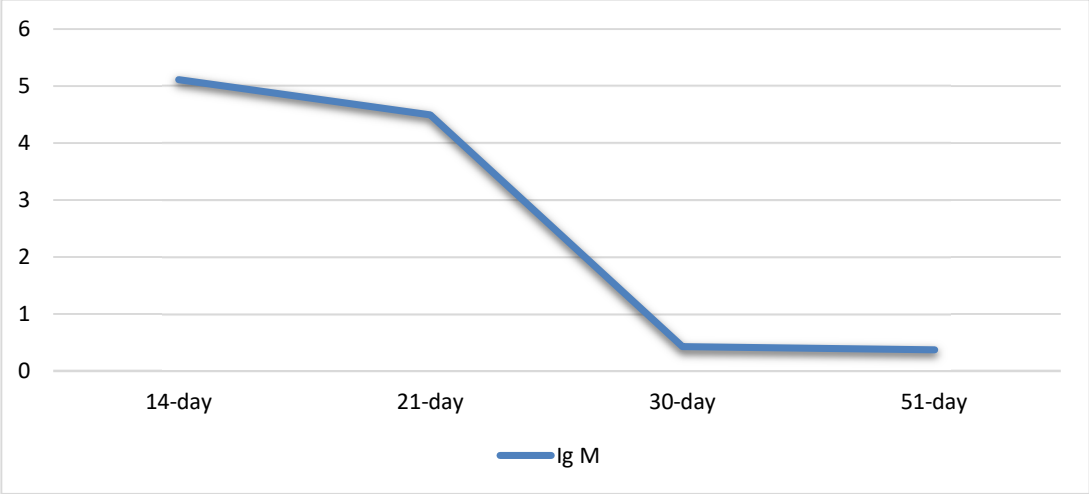

Figure 1. The dynamics of the amount of Ig M and the duration of preservation

Those on the mixer of IgG-At against SARS-CoV-2 were anicized: on the 21st day after vaccination with Component 1, the lower IgG mixer against SARS - CoV-2 was anicized in 31.2% of those vaccinated (P=8) (positivity coefficient-24.07) the mixer of IgG-at increased significantly after vaccination with Component 2 and did not change for up to 30 days (average value of positivity coefficient – 35.87).

In this case, on the 51st day after vaccination, the seroconversion rate was 100%. In a portion of those vaccinated (p=32; 71.1% of those observed), an increase in IgG was anicized on the 30th day after vaccination compared to the 14th day. On the 21st day after vaccination with components 1 and 2, a direct positive correlation bond of 0.69 to 0.29 (r <0.05) was anicized between the mixor of IgM and IgG, according to the mechanism of development of the primary and secondary immune response, this condition is lawful. A significant heterogeneity was found in the humoral immune response dynamics and the circulating duration of anti SARS-CoV-2 At occurring in th 2 cathores. (Figure 2)

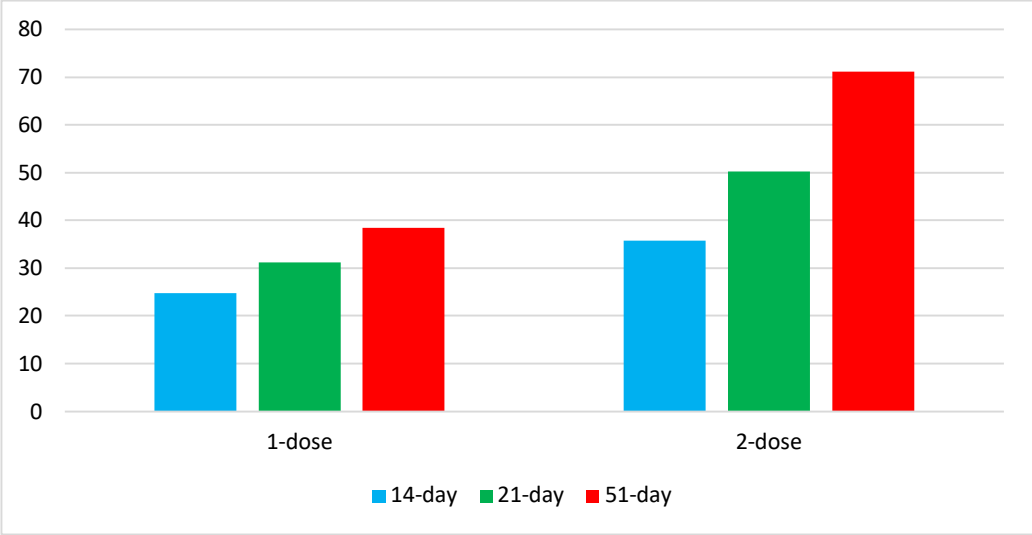

Figure 2. The dynamics of the amount of IG G and the duration of conservation

In this, the enterprise of diversity can be a garden with the individual response of each human organization to a stranger, and heterogeneity is observed at the level of SARS-CoV-2. This may be due to changes in the amount of da in the process of dynamics and shaking of the development of the immune response to the information structure of the virus (SRBD ga, n-nucleoproteid, Matrix, etc.

There may be association with feedback, and heterogeneity is observed at the da level against SARS-CoV - 2. This may be due to changes in the amount of da in the process of developmental dynamics and shaking of the immune response to the virus ' information structure (SRBD, n-nucleoproteid, Matrix, etc.

CONCLUSION

On the 21st day after the introduction of the 1st component of the vaccine in the blood of vaccinated children, IgM-At against SARS-CoV-2 was detected in 100% of cases (average value of the positivity coefficient – 4.94), low IgG was anicized in 31.2% of those vaccinated (P=8) (positivity coefficient-24.07);

On the 30th day after vaccination with the 2nd component, however, there was a natural decrease in the amount of IgM against SARS-CoV-2 (the average urine of the positivity coefficient-0.43), the mixer of IgG - at greatly increased and did not change until 30 days (the average value of the positivity coefficient-35.87). On the 21st day after vaccination with components 1 and 2, a direct positive correlation bond of 0.69 to 0.29 ($r < 0.05$) was found between the mixor of IgM and IgG.

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