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Research Article

MONITORING THE CURRENT STATE OF VACCINATION (REVIEW)

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ABSTRACT

Today, one of the most promising methods of combating COVID-19 is considered complete vaccination, which should provide collective immunity to more than 65% of the total population. As you know, the World Health Organization (WHO) has approved the accelerated registration procedure for vaccines against SARSCoV-2, and several vaccines are already available for use in a number of countries. Table 1 provides a summary of comparative data on various vaccines and their effectiveness when used.

KEYWORDS

Population, comparative data on various vaccines, complete vaccination.

INTRODUCTION

Today, one of the most promising methods of combating COVID-19 is considered complete vaccination, which should provide collective immunity to more than 65% of the total

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population. As you know, the World Health Organization (WHO) has approved the accelerated registration procedure for vaccines against SARSCoV-2, and several vaccines are already available for use in a number of countries. Table 1 provides a summary of comparative data on various vaccines and their effectiveness when used. As can be seen from the table, mRNA vaccines from different developers, vector vaccines from different developers, vaccines with inactivated virus, and others were subject to comparison. Some of them had WHO approval and the effectiveness results expressed as a percentage show that 2-dose vaccines at intervals of 20 to 30 days are still more acceptable, since the e/ffectiveness rates exceed 90%, despite the different number of vaccination /participants[7,8,9].

In short, the objective of our study was to summarize the currently available information regarding the effectiveness and safety of available vaccines, and vaccines approved in Uzbekistan, for the prevention of COVID-19.

Table 1

The effectiveness of vaccines for the prevention of COVID-19, according to clinical studies

Name	Developer	Technology	Research	Effectivity	Dose regimen	WHO registration
BNT162b2	Pfizer/Biotech	mRNA	Phase III - 43 488 participants	95%	Multi -dose with interval 21 days	+
mRNA-1273	Moderna	mRNA	Phase III - 30 420 participants	94.1%	Multi -dose with interval 28 days	+
ChAdOx1nCoV-19/AZD1222	AstraZeneca/ University of Oxford	Adenovirus vector	Phase III - 11 636 participants	70.4%	Multi -dose with interval 28 days	+
Ad26.COV2.S	Janssen/Johnson &Johnson	Adenovirus vector	Phase III - 19 630 participants	66.1	Single dose	+
Gam-COVID-Vac/ Sputnik V	Gamaleya Research Institute of	Adenovirus vector	Phase III - 19 866 participant	91.6	Multi -dose with interval 21	Under consideratio

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	Epidemiology and Microbiology		s		days	n
EpiVacCorona	VECTOR Center of Virology	S protein SARS-CoV-2	Phase III-3000 participats	Results September 2021	Multi -dose with interval 21 days	-
Sputnik Light	Gamaleya Research Institute of Epidemiology and Microbiology	Adenovirus vector	Phase I,II	Results July 2021	Single dose	-
CoviVac	Chumakov Center at the Russian Academy of Sciences	Inactivated vaccine	Information is not provided	Information is not provided	Multi -dose with interval 14 days	-

1.1 Current vaccination status indicators

We have been considering monitoring the status of vaccination against coronavirus in Uzbekistan since the beginning of this campaign on 04/06/2021. As is known, the following vaccines against COVID-19 have been approved in Uzbekistan:

- Moderna
- Oxford/AstraZeneca
- Pfizer/BioNTech
- Sinovac
- Sputnik Light
- Sputnik V
- ZF2001

Studying the current vaccination statistics as of February 5, 2023 (Uzbekistan), we have the following indicators: with a population of 34,382,000 people, the number of vaccinated people was 21,674,823, which in percentage terms was 63.04%. 18,101,452 people were fully vaccinated, which also amounted to 52.65% respectively. The booster dose was 15,319,866, respectively 44.56%. Total vaccinations 74,976,351. As notes, here is a breakdown of the keywords we use:

- number of vaccinated people - the total number of people who have received at least one dose of the vaccine;

- fully vaccinated - the total number of people who have received all doses prescribed by the vaccination protocol;

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- booster dose - the total number of people who received an additional booster dose;

- total vaccinations - the total number of doses administered (the number of single doses may not equal the total number of people vaccinated - depending on the vaccination protocol, people may receive multiple doses)

Current statistics on coronavirus as of March 20, 2023 (worldwide) had their own characteristics, for example: total infections were noted

682,546,142 people. Deaths according to global data amounted to

6,819,835 people, which is a percentage of 1.0%. Recovered - 655,465,609, respectively 96.0%.

Table 2

Percentage of population vaccinated against coronavirus (COVID-19) by leading countries as of 03/18/2023

Countries	Single dose	Multi dose	Total %
Cambodia	3,68	85,3	88,97
UAE	*	*	97
Qatar	*	*	95
Chile	*	*	91
Hong Kong	*	*	89
Nicaragua	*		87,3
Cuba	*		88
China	*	*	88
Portugal	*		87
Spain	*		87
Vietnam	*		85

Note. * - receiving vaccine doses

The data presented in table 2 reflects the percentage of vaccination of the world population against COVID-19. The table shows statistics on complete vaccination against coronavirus - this means receiving all doses prescribed by the vaccination protocol. If a person receives the first dose of a two-dose vaccine, they are not considered fully vaccinated. The table shows the percentages of both partially and fully vaccinated residents. Data is only available for countries that report vaccination statistics. Some countries provide statistics not on people, but on the total number of vaccine doses administered.

As the Ministry of Health of Uzbekistan reported, almost 53 million doses of coronavirus vaccines were used to vaccinate the population in

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Uzbekistan, 16 million doses are in reserve. Full vaccination coverage is 77%, as of May 19, 2022 (according to the Ministry of Health).

To date, according to the Ministry of Health in Uzbekistan, the number of doses of different vaccines against coronavirus in use is close to 70 million, which is much higher than the planned doses of vaccines. For example, the following number of doses was used during vaccination:

• 2,606,080 doses - AstraZeneca;

• 48169038 doses - ZF-UZ-VAZ 2001 (of which 6172770 doses produced in Uzbekistan);

• 1,341,790 doses - Sputnik V;

• 10688860 doses - Moderna;

• 4,626,180 doses - Pfizer/BioNTech;

• 1,976,000 doses - Sinovac;

• 343,375 doses of Sputnik Light.The vaccine reserve is 16 million 200 thousand doses, the ministry's press service said in a statement. The Ministry of Health provided data that the planned coverage of the population with the first dose of the vaccine is 94.6%, and "full vaccination" coverage is 76.9%. However, in October, the Ministry of Health provided information on how many vaccinated people fell ill with coronavirus in the country. Since the beginning of mass vaccination (April 1), of all those sick with coronavirus, only 285 people, or about 0.3%, have received the vaccine, reported the deputy head of the sanitary and epidemiological service.

From the data in Table 3, we see that initially there were preferences for taking vaccines and their doses. For example, the table shows that the predominance of the number of people vaccinated with the 2nd dose, both in general data and, in particular, for specific vaccines. Figure 1 reflects the morbidity characteristics of vaccinated residents as a percentage depending on the frequency of vaccinations. For example, the incidence after 1 dose of Moderna was almost 100%. The AstraZeneca vaccine gave a high rate after 2 doses. While the Sputnik V vaccine gave average incidence rates for both doses. However, the results of morbidity after vaccination with the ZF-UZ-VAZ 2001 vaccine were within smaller limits, but with their own peculiarity, that is, the morbidity after the 3rd dose was the same. Perhaps the reliability of these indicators differs due to the different number of residents who took part in the study.

Table 3

Percentage of vaccinations by vaccine and dose since the start of vaccination

Vaccinated people with ZF-UZVAK	Vaccinated people with Astrazeneka	Vaccinated people with Sputnik V	All surveyed

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Single dose	Multi-dose	Single dose	Multi-dose	Single dose	Multi-dose	Single dose	Multi-dose
236 (46,4%)	272 (53,6%)	53 (13,8%)	332 (86,2%)	46 (52,2%)	42 (47,8%)	409 (27,8%)	649 (44,1%)
508		**385**		**88**		**1058**	

According to information from the Ministry of Health of the Republic of Uzbekistan, studies were carried out of the serological status of persons who received vaccines against the SARS-COV-2 coronavirus, as well as a comparative analysis of immunization in those vaccinated with different vaccines and in residents who did not receive the vaccine.

Table 4

IgG immunoglobulin level in persons who have not received the vaccine

Level of IgG, BAU/ml	**0-1,0 (n=18; 4,3%)**	**1,01-100,0 (n=261; 63%)**	**100,01-1000 (n=114; 27,5%)**	**>1000 (n=2; 0,4%)**
Average index	0,54±0,16	36,1±6,09	226,5±73,1	1649±1261,

As can be seen from the table, the average IgG immunoglobulin level in individuals who have not received the vaccine varies significantly. So, for example, with a titer of 1.01-100.0 it was 63%. Persons with titles of greater significance were encountered much less often.

According to the data of these studies, presented in Table 5, a pattern of increase in the level of IgG immunoglobulin depending on the dose is visible when taking almost all vaccines. There is a more active formation of the IgG immunoglobulin titer from 50% to 65% when taking all vaccines at the 2nd dose. The titer ranges from 100 to 1000 BAU/ml. Tiers over 1000 range from 10% to 15% also when receiving 2 doses of the vaccine. These numbers indicate that vaccination should be complete, according to approved protocols specifically for each vaccine used.

Table 5

Indicators of the dependence of the level of immunoglobulin IgG on the frequency of doses received by vaccines

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Level of IgG, BAU/ml	0-1,0		1,01-100,0		100,01-1000		>1000	
	Single dose	Multi -dose	Single dose	Multi-dose	Single dose	Multi-dose	Single dose	Multi-dose
ZF-UZVAK	1-5%	0,5-2%	32%	53%	31%	60%	0,5%	10%
Astrazeneka	0,5%	0,1%	35%	65%	35%	53%	-	10%
Спутник V	0,5%	-	33%	55%	48%	53%	-	15%

CONCLUSION

In conclusion of the monitoring carried out on the issue of the current situation with vaccination for Covid-19, it should be noted that no matter how "dissident" events were carried out aimed at refusing vaccination in general and against Covid-19 in particular, the correct actions of the media information and sufficient awareness of the population about this problem directs measures to form collective immunity from Covid-19 in the right direction, which reduces the percentage of seriously ill patients, elderly and senile patients, deaths in various age groups, and also leads to a mitigation of complications after past infection.

The preventive strategy for this problem is absolutely provable. The effectiveness of vaccination is reflected statistically reliably in many countries and in almost all age and gender groups of residents.

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