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# OPTIONS FOR COVID-19 VACCINES IN BULGARIA – ACCEPTANCE AND HESITANCE

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***Abstract.*** *The COVID-19 pandemic continues to take thousands of lives every day. Vaccine prophylaxis has been shown to be highly effective in both controlling and eradicating a number of communicable diseases, in particular COVID-19, as well as in preventing hospitalization and death. Globally, the level of vaccination varies widely. The aim of the present study was to study the attitude to vaccination against COVID-19 among the adult population in the Republic of Bulgaria. An online-based survey was performed to gather information on the attitudes of the population regarding the use of COVID-19 vaccines and the reasons for refusal. The survey includes 662 respondents from all over Bulgaria and covers the period from October 12, 2021 to October 22, 2021.*

**Key words:** *COVID-19 vaccine, acceptance, attitudes, vaccination intent, Bulgaria*

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## INTRODUCTION

The COVID-19 pandemic is the global health crisis of our time and the greatest challenge we face since the Second World War. It is emerging as a scientific and social challenge on all aspects of daily life that has shaken humanity and changed lifestyles and medical practices [1].

According to the WHO, as of November 8, 2021, there were 3 449 489 confirmed cases of COVID-19 worldwide. Until the same date, a total of 7 160 396 495 doses of vaccine had been administered [2].

In Bulgaria, until the same date, the total number of infected was 654 819, the deaths – 26 191 respectively, and the total number of persons with a completed vaccination course was 1 620 045, according to the Unified information portal [3]. While 76.1% of EU citizens are fully vaccinated, their share in Bulgaria is 27.4% [4].

According to Our World in Data as of 14.11.2021, when the world is again under the target of the pandemic, the increase in the number of people infected with COVID-19, hospitalizations and deaths, Bulgaria became a leader in the number of deaths, while at the same time it is at the bottom of the ranking in terms of number of vaccines administered [5].

Vaccines are one of the most effective available medical interventions and save millions of lives each year. According to the WHO, immunization prevents between 2 and 3 million deaths each year from life-threatening infectious diseases. Immunization is a key component of primary health care and is one of the best health investments. Vaccines are crucial for the prevention and control of outbreaks

of infectious diseases and are at the heart of global health security [6].

The development and rapid administration of COVID-19 vaccines is a fundamental step towards ending the pandemic, protecting health systems and helping global economies to recover [7]. High levels of vaccination will reduce the spread of the virus and help prevent new variants. The main purpose of vaccination is to prevent serious illness, hospitalization and death – this is demonstrated by COVID-19 vaccines [8].

The pace of vaccination is just as important as the size of the population, and therefore attention to vaccination programs is crucial. While vaccines have been shown to be effective in preventing hospitalization and death, their even wider use is recommended. Globally, the level of vaccination varies widely.

Israel was the first country in the world to show that vaccines break the curve of COVID-19 infections. The country is a world leader in early vaccination, and by February 2021, more than 84% of people over the age of 70 had received two doses. As a result, cases of COVID-19 declined rapidly and a similar pattern of vaccination and recovery was seen in other countries. Vaccines remain effective in reducing hospitalizations and deaths. Globally, unvaccinated people are at greater risk than ever [9].

Vaccinations against COVID-19 in the United States began on December 13, 2020 and by November 14, 2021, 439.03 million doses had been administered and 67.24% of the population had been fully vaccinated [10]. A study conducted in the United States in 24 hospitals in 14 states between January and March 2021 evaluated the effectiveness of Pfizer-BioNTech and Moderna against COVID-19 among hospitalized adults aged ≥65 and provided reliable real-world data. The effectiveness of the vaccine in preventing hospitalization in adults over 65 years of age was 94% for those who were fully vaccinated and 64% for those who were partially vaccinated [11].

A similar effect of the vaccine was observed in the United Kingdom. A study of the effectiveness of the Pfizer-BioNTech and Oxford-AstraZeneca vaccines on COVID-19 related symptoms, hospitalization and mortality in elderly in England reported that a single dose of Pfizer-BioNTech vaccine was approximately 60-70% effective in preventing symptomatic disease in adults aged 70 years and older, and two doses were approximately 85-90% effective. Those who were vaccinated and had symptoms had a 44% lower risk of being admitted to hospital and a 51% lower risk of death than people who had not been vaccinated [12].

Vaccination against SARS-CoV-2 is a leading strategy to change the course of the COVID-19 pandemic worldwide. Data from a study on the risk factors and disease profile of SARS-CoV-2 infection after vaccination in users of the COVID Symptom Study application gave an early idea of the actual efficacy of COVID-19 vaccines. The data included more than 1.2 million people who had received their first dose of vaccine between December 8, 2020 and July 4, 2021. Of them 0.5% or 6030 tested positive for COVID-19. Vaccination, compared with the lack of immunization, reduced the risk of hospitalization and the likelihood of symptoms in the first week of illness [13].

According to the Public Health England (PHE), there is growing evidence that vaccines help in reducing the transmission of the virus and save thousands of lives every day. PHE used real-life data for December 2020 – March 2021 to analyze how effective vaccines are. Data and estimates show that the active vaccination policy in the UK has prevented more than 9 000 deaths in people over the age of 80 alone and approximately 10 400 deaths in people over the age of 60. This analysis was based on the direct effects of vaccination on mortality [14].

A study conducted in the period January 1 – August 20 2021 by the University of Montpellier together with physicians from the intensive care unit of the University Hospital of Nimes examined the effect of the vaccination campaign on mortality from COVID-19 in France. Data from the study showed that vaccination against COVID-19 in France had helped to avoid around 47 400 coronavirus-related deaths. It suggested that in addition to reducing mortality by 57%, vaccines have helped to reduce hospitalizations by 46%. The data also suggested that vaccines have allowed people to avoid serious COVID-19 disease in 88% of cases [15].

Statistics from Canada show the number of deaths from COVID-19 in Canada from December 2020 to October 2021 by vaccination status. As of October 23, 2021, there had been about 7 482 confirmed deaths among unvaccinated Canadians since the start of the national vaccination campaign in December 2020. In contrast, only 733 deaths from COVID-19 were reported among those fully vaccinated during the same period [16]. For the same period, statistics were available for the number of confirmed cases of COVID-19 hospitalized in Canada by vaccination status. Since the start of the vaccination program in Canada in December 2020, approximately 37 837 unvaccinated Canadians had been hospitalized with COVID-19 infection, compared to 2 482 fully vaccinated Canadians [17].

According to data from the Ministry of Health in Bulgaria for the period March 1 – September 24, 2021,

10 173 people died. Only 78 of them were vaccinated, which is 0.77% of the total number of deaths. For the period July 28 – September 26, 2021 93% of those hospitalized with COVID-19 in Bulgaria have not been vaccinated [18].

The CDC (Centres for Disease Control and Prevention) provides weekly data on cases of COVID-19 and deaths by vaccination status and by type and manufacturer of vaccine. Despite these differences, the general message is clear: unvaccinated people were at much higher risk of becoming infected and dying from COVID-19 [19].

COVID-19 vaccines reduce the risk of SARS-CoV-2 infection and help prevent serious illness in the event of infection. The CDC monitors and analyzes the effect of COVID-19 vaccines. So far, studies have shown that vaccines against COVID-19 reduce the risk of COVID-19, a severe course of the disease among people who are fully vaccinated [20]. The incidence of SARS-CoV-2 infection, hospitalization and death is higher in unvaccinated than in vaccinated individuals.

## MATERIALS AND METHODS

An anonymous survey was conducted to collect information on the attitudes of the population in Bulgaria regarding the use of COVID-19 vaccines. The survey is an online-based survey developed using Google Forms. The online research method used allows fast and cost-effective data collection, while being safe in a pandemic situation. The participants in this study were adult citizens of the Republic of Bulgaria, questioned in the period from October 12, 2021 to October 22, 2021 (until the entry into force of restrictive measures requiring a Green Certificate). The questionnaire was distributed through the social networks Facebook and Viber, thus covering the entire territory of Bulgaria. The reliability of the collected individual primary information can be considered high. The percentage of responses corresponds to the total number of responses. The first part contained 15 questions and collected general and demographic information. The second part of the Survey referred to already vaccinated persons and included 9 questions. Some of the questions allowed for more than one answer. The questionnaire was prepared for the purposes of a dissertation, which covers the HEALTH TECHNOLOGIES ASSESSMENT of COVID-19 vaccines. The dissertation is available at the Department of Health Technology Assessment at the Faculty of Public Health at the Medical University – Sofia.

## RESULTS

This study was conducted in an attempt to fully understand and gather comprehensive information about the attitudes of the population in Bulgaria regarding COVID-19 vaccines, the results of which outline the current situation and people's opinion. The scope of the study complied with the introduction in force on 21.10.2021 of the Green Certificate requirement. It was taken into consideration that the survey would be active for a period of 3 weeks in order to include as many respondents as possible in order to ensure greater representativeness and reliability of the results. In practice, the Survey was active for a period of 10 days, as the situation changed public attitudes and did not correspond to the objectives of the survey. The Survey included 662 participants from different cities in the country, from different age groups, professional status, education and gender. Of all 662 respondents, the gender distribution was 74.5% women and 25.5% men. The age range of the participants in the survey varies from 18 years to 83 years. The largest share of respondents falls into the age group 30-50 years – 57.31%, followed by the age group 51-65 years – 27.74%. The group aged 18-29 comprised 12.35% respectively, and the respondents in the age group over 66 – 2.3%. The predominant part of the participants in the survey had higher education – 75.4%, secondary education – 18.1%, doctoral degree – 5.6% and 0.9% had primary education.

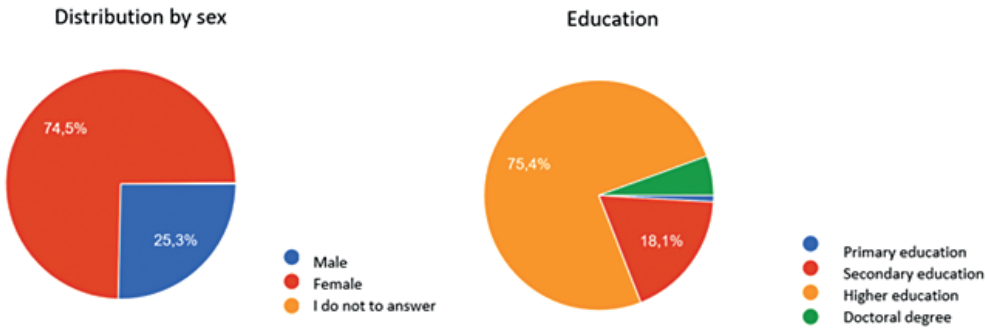



**Fig. 1.** Demographic data of the participants: Gender and level of education

The distribution of the Survey through social networks practically covered the population of whole Bulgaria. In addition to the residents of large regional cities, the study also included residents of smaller settlements, including several villages in Northwestern Bulgaria. The largest share of respondents was from Sofia – 30.2%, followed by Vratsa – 28.1%, Varna – 5.1%, Montana – 4.2%, Pleven – 4.1%, Plovdiv – 3.6 %, Vidin – 1.8%, Ruse – 1.2%, Burgas and Veliko Tarnovo 0.9%, and Stara Zagora, Pernik and Sliven – 0.4%.

The predominant part (87.2%) of the respondents were working people, including 71.2% employees and 15.7% employers. The share of students was 6.8%, pensioners 3.9% and only 2.1% were unemployed.

The financial status of the respondents was divided into six groups, with the largest share of 33% with montly incomes between 1000-2000 BGN. The group between 2000-3200 BGN included 21.6%, the proportion of participants with an income over BGN 3200 was 19.5%, and 13.8% fell into the group above the minimum wage up to BGN 1000. 7.1% of the respondents had no permanent monthly income, and only 4,9% had an income below the minimum wage BGN 650. The professional realization of the participants in the survey was from all areas of public life, with the largest share of those employed in the Health sector – 38.1%, followed by the Services sector – 20.1%. Those employed in Education were 10.6% respectively. Regarding ethnicity, 97.3% of the respondents' self-identify was Bulgarian, Turkish – 0.8%, Macedonian or other self-identify – 1.9%. Among the participants in the Survey, the proportion of people who did not suffer from COVID-19 was higher – 59.1%, and those who did suffer were 40.9%. Of those who got clinical disease 43.3% registered the infection following a positive PCR test, 21.8% – by an antigen test, and 26.2% – by symptoms only. 3.1% had only positive antibodies and only 2.5% were diagnosed after a telephone consultation with a GP.

Asked whether the available information on COVID-19 vaccines was sufficient, 58% of respondents said NO and 42% thought it was sufficient. Regarding the reliability of the available information 59.4% found it reliable and 40.4% believed that it was not reliable.

The first part of the Survey concerning both vaccinated and non-vaccinated people, included three questions examining the opinion of the respondents regarding the campaign conducted in Bulgaria for the implementation of COVID-19 vaccines. Regarding the evaluation of the campaign 53.8% believed that there had been a lack of a detailed and high-quality public campaign to inform the public about the effectiveness and safety of vaccines, 51.7% underlined the need for a more serious awareness campaign by reputable representatives of the medical and the pharmaceutical field, and 42% of respondents believed that there were no

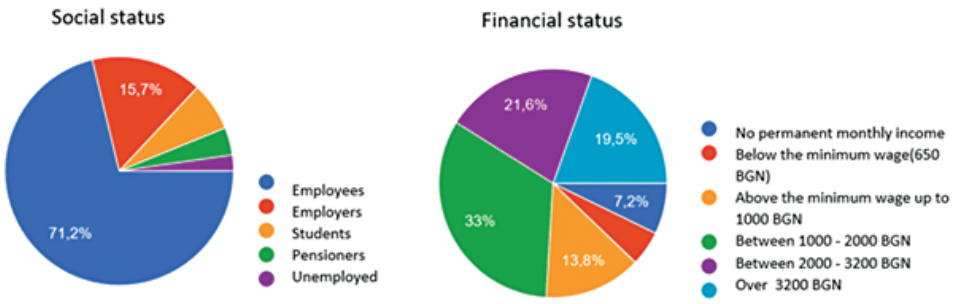



**Fig. 2.** Demographic data of the participants: social and financial status




**Fig. 3.** Opinion about information provided by official sources

clear messages in the Campaign. Not a small part of the respondents (33.25%) found the Campaign to be predominantly politically oriented, and a small percentage of 3.85% were satisfied with it. There were also allegations that the campaign was "aggressive, coercive and discriminatory", and some even found it "scandalous, intrusive and trivial". There were also believes that the campaign was "inconsistent, contradictory and divided the society in for and against." There was a reproach that the Campaign had not been presented in an accessible language and incorrectly presented the information. According to some of the views expressed, there was no campaign at all. Proposals have been made for legal sanctions for false and misleading information provided by the media and medics, as well as for limiting public appearances of outright misinformation and depoliticizing the vaccination campaign. According to some, it would be useful to present personal experience from proven experts, artists, even politicians with an impeccable reputation. The fact is noted that the political situation and the persistent distrust of the institutions is the main reason for the situation.

Considering the specific question "How do you assess the incentive game organized by the Ministry of Health with prizes for vaccinated persons against COVID-19?" the disapproving answers prevailed. Nearly half of the respondents (46.2%) found it inappropriate, 36.8% assessed the analogy of health with a game with prizes to be frivolous, 29.4% did not approve, and 8.6% found it too late; and only 3.6% approved it. 43.9% of respondents believed that the Ministry of Health should promote vaccination against COVID-19, but not with a raffle, but with a reasonable explanatory campaign.

Asked whether the COVID-19 vaccine campaign influenced the decision to vaccinate, the majority of respondents said it did not influence their decision to be vaccinated. The largest share of 46.5%, said they had decided to get vaccinated by themselves, 22.2% said that the campaign had influenced them to not get vaccinated, while only 9.9% said that the campaign had influenced them to get vaccinated. Almost the same 9.5% is the proportion of respondents who had decided to get vaccinated after consulting a doctor. 7% decided to get vaccinated by trusting the Internet. A small percentage of respondents said that they had decided not to get vaccinated or have done so under force due to the imposed restrictions in the social environment and social communication.

Of interest are also the answers to the question why the respondents were not vaccinated against COVID-19. The largest share of respondents (31.6%) did not believe in the safety of vaccines. Almost as many as 31.2% answered that they had acquired immunity after an illness and believed that it would be longer lasting. Nearly a quarter of 23.9% of respondents said they feared possible side effects. Comparably 21.1% is the share of those who hesitated due to the fact that they were not convinced of the benefits of vaccines. The same is the percentage (21.5%) of those who claimed that vaccines are "experimental" and have not been scientifically proven. Some respondents (17.4%) said they would postpone vaccination to await results in people who had already been vaccinated. 11.3% had not been vaccinated for medical reasons and due to personal decision. Likewise, 11.3% said they need more information and only 19% stated they do not want and will not be vaccinated.

Attention must be focused on the answer to the question of whether respondents had so far been vaccinated with other vaccines. In contrast to the reluctance to be vaccinated against COVID-19, 95.8% were vaccinated against influenza, tetanus and with vaccines according to childhood immunization schedule. 2.9% said they had not been vaccinated with other vaccines and 1.4% did not know if they had been vaccinated.

The second part of the Survey included already vaccinated participants and contained 9 questions. Of all respondents, 63.7% received the COVID-19 vaccine. Of the total number of vaccinated, the percentage of people with higher education was 89.36%. According to the financial status of the respondents, the largest share of vaccinated – 55.65% fell among people with monthly incomes over BGN 2000, the percentage of those vaccinated with income in the range of BGN 1000-2000 was high respectively 42.03%. Vaccinated persons with incomes below the minimum wage (BGN 650) were 4.35%.

Data on the level of vaccination among employees in two of the most important spheres of public life – Health and Education are also noteworthy. Of the respondents employed in the Health sector, the proportion of vaccinated is 69.68% and 30.32% do not have a vaccine. Among those employed in the Education sector, 58.57% have been vaccinated and 41.43% have not. The largest proportion of people were vaccinated with mRNA vaccines – 76.8%, 64.5% of which with the vaccine Pfizer/BioNtech and 11.4% – with Moderna – Nearly 1/4 of those vaccinated had the Astra Zeneca/Oxford vaccine (19.7%) and only 4.5% – the Johnson & Jonson/ Janssen vaccine.

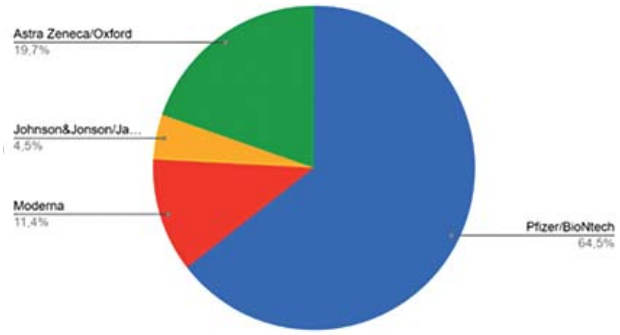



**Fig. 4.** Applied vaccines per product

The largest number of vaccines was administered during April and May 2021, followed by March and January 2021. During the summer months, few vaccines are applied, and a trend upward was seen again in August and September. When asked if they had the right to select which vaccine to receive, 65.1% answered affirmatively, with 52.1% making their choice at a vaccination center and 13% at a GP office. 27.1% did not have the right to select due to the fact that no other alternative was available, and 7.8% were vaccinated at the workplace and also did not have the right to choose.

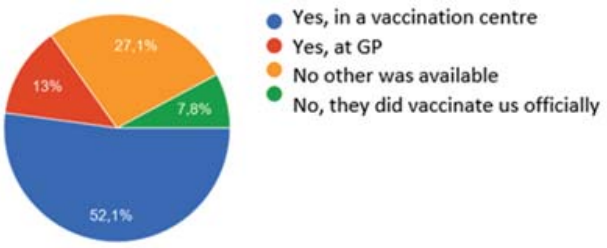



**Fig. 5.** Right to chose a vaccine

Leading for the choice of vaccine in 62% of the respondents was the technology of vaccine production. The published scientific data influenced 47%, and 16.2% took into account the manufacturer also. The number of doses influenced 4.9% of respondents. Preferring the type of vaccine 9.5% reproduced the choice of a family member, 5.1% of friends and 4.1% of colleagues. Some respondents said they did so out of a desire to be vaccinated and have taken advantage of the vaccine available so far. Some respondents said they made their selection under the influence of published WHO data and the vaccination process in Israel and the United States, as well as the vaccines used there.

A deeper understanding of the decision to vaccinate is provided by the answer to the question about the motives which led to a positive decision. For 90% of vaccinated people, the main reason for getting vaccinated was their own free will to protect themselves and their beloved ones. More than half of 56.5% said they were convinced of the benefits of vaccine prophylaxis. As a reason for vaccination, 1/5 of the respondents stated that they personally knew a person who died as a result of COVID-19 or a person hospitalized as a result of COVID-19. For 13.2%, the reason for vaccination was the possibility of a trouble-free travel. As another motive 7.4% indicated that it was on the recommendation of a medical doctor, and for 1.7% on the recommendation of an employer. The rationale for vaccination was family advice in 4.8%, advice from friends in 1.9% and advice from colleagues in 1.7%. The fact that the decision to vaccinate was voluntary had been confirmed by 94.3% of the respondents, with 83.9% deciding on their own without pressure. 5.8% also made a family-like choice without pressure, and 4.6% made a friend-like choice. Only 5.7% of the respondents answered that they were forced to get vaccinated, with 2.3% of them being subjected to official work, and the rest to family or friends.

How and to what extent the media have influenced the decision to vaccinate is shown in Fig. 6.

The opinion of 60.9% of those vaccinated was that the media did not influence their choice. The opinion of proven epidemiologists, immunologists, established medical specialists had influenced 29.5% only. The publication of the results of clinical trials influenced 18.8% and only 3.3% of respondents were influenced by the opinion of experts opposing COVID-19 vaccines.

The last question from the Survey aimed to find out whether the respondents would get the 3rd (booster) dose of vaccine. 66.4% gave a positive answer, and 11.1% would not do so yet. 14.7% were unable to have their own judgment – and 10.4% would take a third dose on a doctor's recommendation only.

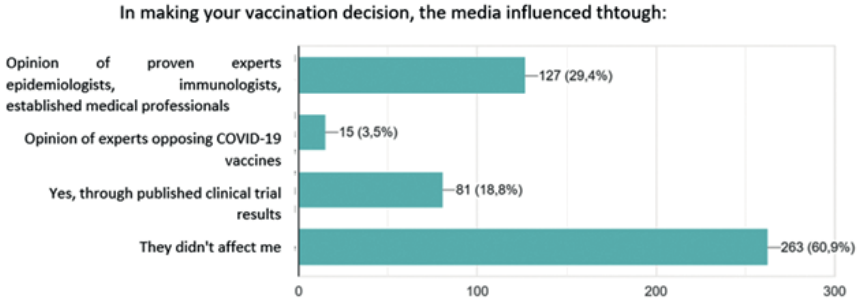



**Fig. 6.** Influence of the media in deciding on vaccination

## DISCUSSION

The survey tried to collect information on the attitudes of the population towards COVID-19 vaccines, as well as to analyze the opinion of people and their attitude on this topic. The motives and barriers of the respondents were studied. In order to put an end to the global health crisis, it is necessary to ensure not only that everyone in the world has access to COVID-19 vaccines, but also that populations everywhere are ready to accept them and do so quickly enough, to mitigate the risk of vaccine-resistant mutations [21].

To encourage vaccination against COVID-19, we need to know whether people are willing to be vaccinated against COVID-19, the reasons why they are willing or unwilling to do so, and the sources of information that influence decision-making. The widespread adoption of COVID-19 vaccines is crucial for achieving sufficient immunization coverage and end the global pandemic. Vaccine use in low- and middle-income countries is primarily due to the interest in personal protection against COVID-19, while concerns about side effects are the most common cause of hesitation [22].

The main factors associated with vaccine hesitation both worldwide and in Bulgaria include perceptions of risk, safety, efficacy and trust. Public trust is influenced by media coverage, political identity and trust in official authorities. Trusted sources must take proactive roles in providing balanced and accurate information on the Internet, social media, news programs and local television media [23].

The adoption and increased use of COVID-19 vaccines is crucial for achieving sufficient immunization coverage to end the global pandemic. Whether we present it as hesitation or mistrust, everyone needs access to reliable information about vaccines. Therefore, the role of proven clinicians and researchers is crucial for overcoming mistrust and negative perceptions about the vaccine, as well as to promoting trust in vaccinations.

The main emphasis is on providing correct information. The media must also provide accurate and balanced coverage, building trust and encouraging the population to be vaccinated. Communication about a vaccine, as well as safety and efficacy issues, must be credible and transparent. We are currently living in “infodemic” – there is an excessive amount of information available about vaccines and many users are struggling to identify exactly what is best to best meet the health needs of their families [24].

Conspiracy theories and mistrust are spreading around the world, but many countries have managed to stop and reverse the trend from destructive public distrust to increasing vaccination rates. Indicative in this regard is the information provided on Our Word in Data, which shows monthly data from a study by the Imperial College London Data Center YouGov Covid-19 Behavior Tracker on people’s desire to be vaccinated against COVID-19 [25].

This change is particularly significant in France, where anti-vaccination attitudes were widespread at the beginning of the vaccination campaign, and at 15.11.2021 the percentage of those who received at least one dose was 81.2% [26].

At the same time, Bulgaria continues to be at the top of the world in terms of COVID-19 mortality per capita, and Bulgarians are among the most negative respondents about vaccines worldwide. Low levels of vaccination, in turn, are a prerequisite for high mortality. The main reasons for this situation are the lack of communication and lack of trust in the institutions. People are not convinced of the benefits and safety of vaccines and share unfounded fears. Vaccines have been proven to be one of the most important tools for preventing and controlling emerging infections, which are the cause of a huge number of deaths in the world [27].

## CONCLUSIONS

Vaccines are the tool that will help us to deal with the COVID-19 pandemic, and the fact that they are effective and safe has been confirmed by numerous studies and real practice in countries with high vaccination coverage. Unfounded fears can be overcome by conducting a large-scale information campaign by proven health experts, which must provide in understandable language scientific evidence for the benefits of vaccine prevention. Uncertainty and the need for information can be overcome by offering a comprehensive and well-intentioned campaign based on scientifically sound and reliable information.

***Disclosure Summary:*** *The authors have nothing to disclose.*

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