Wiadomości Lekarskie

Official journal of the Polish Medical Association

Memory of
dr Władysław
Biegański

VOLUME LXXV, ISSUE 11 PART 2, NOVEMBER 2022

Since 1928

ALUNA Publishing House

Wiadomości Lekarskie is abstracted and indexed in: PUBMED/MEDLINE, SCOPUS, EMBASE, INDEX COPERNICUS, POLISH MINISTRY OF EDUCATION AND SCIENCE, POLISH MEDICAL BIBLIOGRAPHY

Wiadomości Lekarskie

Distribution and Subscriptions:
Bartosz Guterman prenumerata@wydawnictwo-aluna.pl
Graphic design / production:
Grzegorz Sztank www.red-studio.eu

Publisher:
ALUNA Publishing House
ul. Przesmyckiego 29,
05-510 Konstancin – Jeziorna
www.wydawnictwo-aluna.pl
www.wiadomoscilekarskie.pl
www.wiadlek.pl

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THE MAIN ASPECTS OF COUNTERING PANDEMIC INFECTIOUS DISEASES THROUGH VACCINATION IN THE CONTEXT OF PROTECTING HEALTH AND OVERCOMING PSYCHOLOGICAL BARRIERS

DOI: 10.36740/WLek202211212

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ABSTRACT

The aim: Study of opinions and attitudes of citizens towards vaccination, identification of the reasons for the refusal of vaccination, the main psychological barriers.

Materials and methods: As a result of the analysis the main reasons for the refusal of vaccination were systematized into 5 groups. For practical clarification of the main reasons for the refusal of vaccination, we conducted a survey of citizens of the family medicine outpatient clinic in one of the Ukrainian cities. A total of 30 respondents took part in the survey.

Results: The results of the survey were systematized, according to which it was found that today there is still a negative attitude towards vaccination, although some of the respondents who have a positive attitude towards vaccination are much larger in the context of today's pandemic realities. The main reason for not vaccinating is a lack of trust and confidence in vaccine safety.

Conclusions: To date, vaccination, including against COVID-19, is the only method of combating the pandemic. The identified reasons for the refusal of vaccination, according to the authors, are due to the lack of proper informatization of the population and the low level of trust in global and national medical institutions.

KEY WORDS: infectious diseases, vaccination, public health

Wiad Lek. 2022;75(11 p2):2785-2790

INTRODUCTION

In the last decade, infectious diseases have had a significant impact on the statistics of morbidity and mortality of the population and required significant expenditures from national health authorities. According to the World Health Organization (WHO), vaccines are now available for more than 30 infectious diseases. In the arsenal of immunoprophylaxis there are more than 60 effective vaccine preparations, different in composition, method of application and effectiveness. However, the improvement of immunoprophylaxis measures, the latest development methods to increase efficiency, the design of genetically engineered vaccines using virus-like particles, the creation of plant-based vaccines, as well as new adjuvants (substances that increase the immunogenicity of vaccine preparations) are an important issue in modern immunology [1].

The emergence in November 2019 of the novel coronavirus SARS-CoV-2, which caused coronavirus disease 2019 (COVID-19), is having devastating consequences around the world. Control measures such as the use of masks, maintaining social distancing, mass testing of symptomatic and asymptomatic individuals, contact tracing and isolation, and the introduction of quarantine measures have helped to limit the transmission of the pathogen where they were severely applied; however, these actions were taken in a variety of ways and were not sufficient to prevent the spread of the novel coronavirus disease. The COVID-19 pandemic has now reached every continent, with more than 111 million laboratory-confirmed cases and more than 2.4 million deaths.

In the absence of effective therapeutic agents and preventive measures, vaccines against this disease have become the subject of increased attention. Since January 2020, when the sequencing of SARS-CoV-2 was carried out, scientists from different countries have been actively working to develop different types of vaccines against COVID-19. Vaccines are needed to reduce the morbidity and mortality associated with this disease, and many platforms have been involved in the rapid development of vaccine candidates. Usually, vaccines require years of research and testing before being used, but in 2020, scientists have begun the competition to produce safe and effective coronavirus vaccines in record time [2].

Currently, more than 170 vaccines are in preclinical development and about 60 are in clinical development. There are a number of licensed vaccines or those moving towards

phase trials. Scientists are using different approaches to create a vaccine against COVID-19. Currently, there are 7 main platforms. In particular, two categories are based on nucleic acids: RNA and DNA. These are new generation vaccines. The third platform is protein-based vaccines (subunit vaccines), for the manufacture of which various technologies for the preparation of viral immunostimulatory protein antigens are used. The next two platforms are viral vectors of the type used in gene therapy. In particular, vectors are used that both do not replicate and replicate. Two more categories are the SARS-CoV-2 viruses themselves: either inactivated or in a weakened live version. Vaccines are also being developed that do not fit into any of the above categories. These are vaccines based on virus-like particles or using killed rabies pathogen (CORAVAX) and/or modified equine pox virus (TX-1800) as viral vectors [3].

Research in the direction of obtaining vaccines by genetic engineering methods is carried out in many laboratories around the world. Significant progress has been made in the expression in bacteria and yeast of genes encoding the surface proteins of the influenza virus, hepatitis B, poliovirus, rabies, foot-and-mouth disease, etc. However, the high cost of producing new vaccines and legal issues regarding their applicability, strict regulations regarding the immunization of healthy people, and rather limited income from vaccine production are significant barriers to pharmaceutical companies from entering the vaccine business. Therefore, in recent years, the number of vaccine manufacturers has significantly decreased, which has led to a decrease in competition and interest in investing in this industry.

Today, in the practical healthcare system, vaccines are used that were developed many years ago, but improved with the development of immunology due to the need to improve their safety, tolerability and effectiveness. As a result, products with improved characteristics have appeared, but the production of which is impossible without complicating technological processes.

At the same time, some drugs developed decades ago are used (for example, the flu vaccine is still produced using outdated methods).

The goal of modern immunology is to create vaccines produced using modern technological processes, in significant volumes and at a speed that allows us to meet the existing needs in mass vaccination events.

A vaccine is a medical product intended to create in the body of vaccinated people or animals active immunity to infectious diseases. Depending on the mechanisms of formation, hereditary and acquired immunity are distinguished. The hereditary is sometimes called species, since it is inherent in all individuals of a given species and is transmitted from generation to generation. Acquired immunity is not inherited and is formed as a result of an infectious disease or as a result of immunization [4].

The problem of vaccinating the population is critically important when it comes to pandemic diseases. Today, the global medical community is faced with a new type of pandemic disease – coronavirus infection. Mass vaccination against coronavirus disease today is the only way to overcome this pandemic. Given this, it is especially important to determine the current attitude of citizens to the vaccination process and to determine the main reasons for refusing to vaccinate.

THE AIM

The main purpose of the article is to study the current state of readiness of citizens for vaccination and re-vaccination against COVID-19 in the context of today's pandemic realities. In addition, an important issue of our study is to identify the main reasons for the refusal of vaccination during the survey.

MATERIALS AND METHODS

Recent years have been marked by the spread of the SARS-CoV-2 coronavirus around the world as a challenge to all mankind. The pandemic has affected all aspects of the public and private life of people, entire states. The words "quarantine", "lockdown", "state of emergency", "epidemic", "pandemic", "herd immunity" and other related concepts have entered daily use. We began to use masks, disinfect, wash our hands more often and physically distance ourselves from each other. COVID-19 has affected the global economy, world politics, international relations and has changed the values and attitudes of societies, habits and everyday realities. One of the most important tools on the path to normalizing the situation after the pandemic is universal vaccination, the result of which should be the formation of herd immunity. The main barriers to vaccination are the lack of confidence in the effectiveness of vaccines, the lack of adequate information in sufficient quantities and the fear of side effects [5].

Even in the relatively recent past, the population did not think about the need for vaccination, about complications – the need for vaccinations was an axiom. The effectiveness of vaccination was evident, as evidenced by the lower number of infectious diseases compared to today.

Today, attitudes towards immunization have changed dramatically. The population hears about the positive aspects of vaccination only in «dry» statistics, and any case of a post-vaccination complication, real or imaginary, is inflated, causing lively public interest. As a result, confidence in vaccination, especially against pandemic diseases, is falling sharply.

In particular, more than 1.5 million users discuss the problems of vaccination on Internet forums every month, two-thirds of which demand that mandatory vaccination be abolished altogether. Due to this, the issues of routine vaccination over the past few years have gone far beyond the competence of physicians, affecting the interests of politics, economics, ethics, philosophy and even religion [6].

Scientists began to study doubts about vaccination long before the appearance of the coronavirus. They studied different models of human behavior and found out the most promising ones. After analyzing the relevant scientific

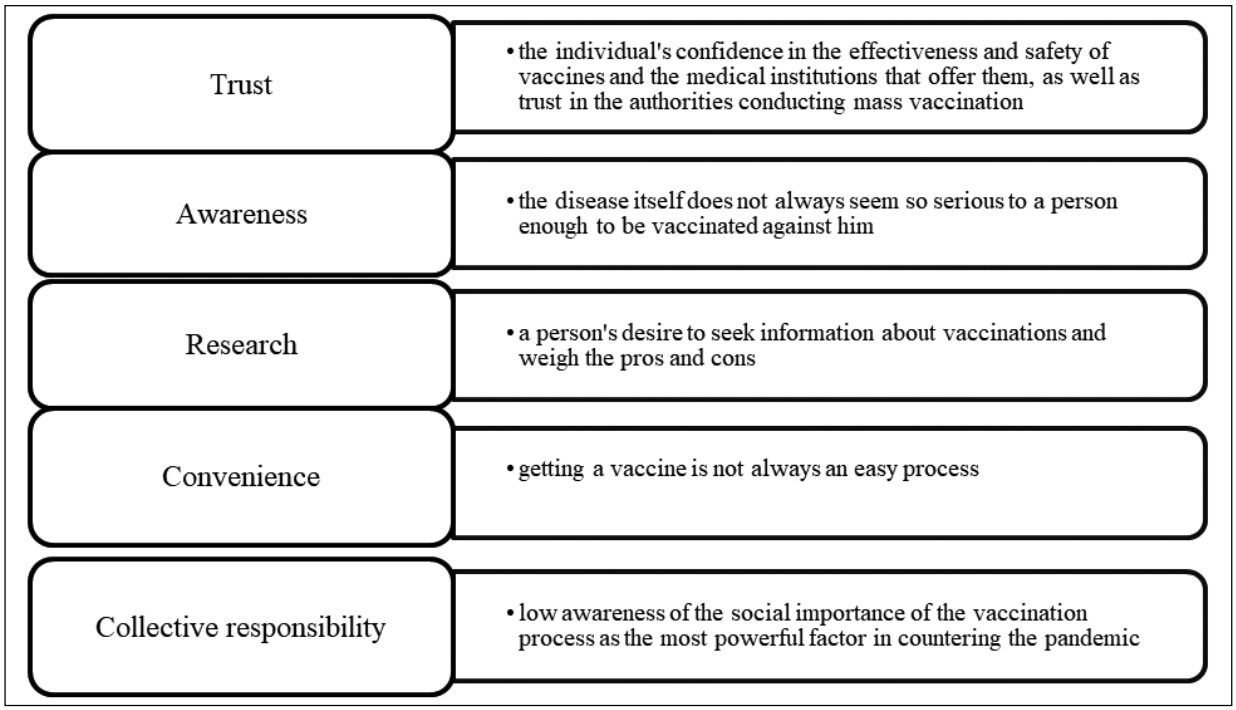

Fig. 1. Major psychological factors and barriers to vaccination

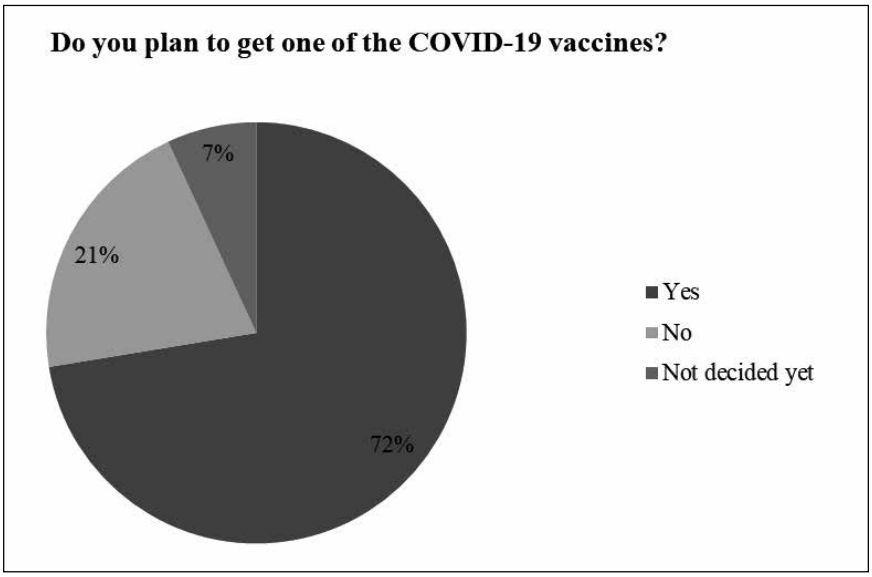

Fig.2. The results of the answer to the question «Do you plan to get one of the COVID-19 vaccines?»

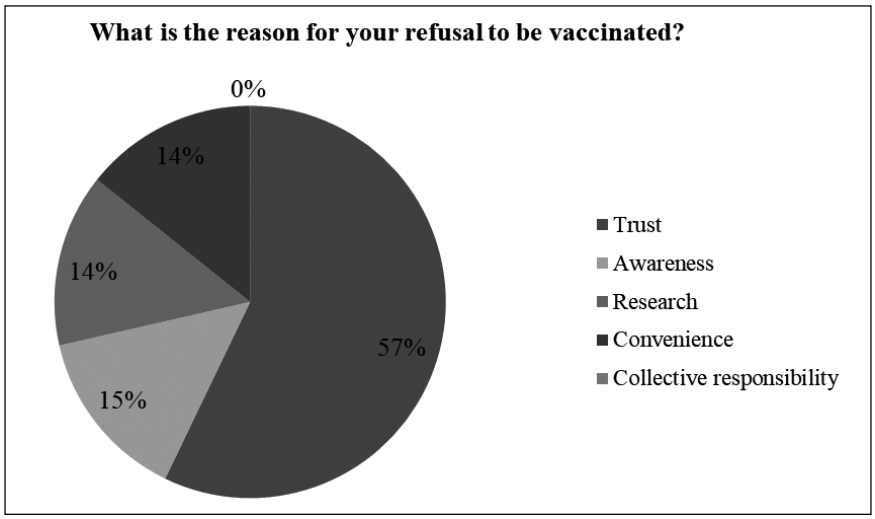

Fig.3. The results of the answer to the question «Do you plan to get one of the COVID-19 vaccines?»

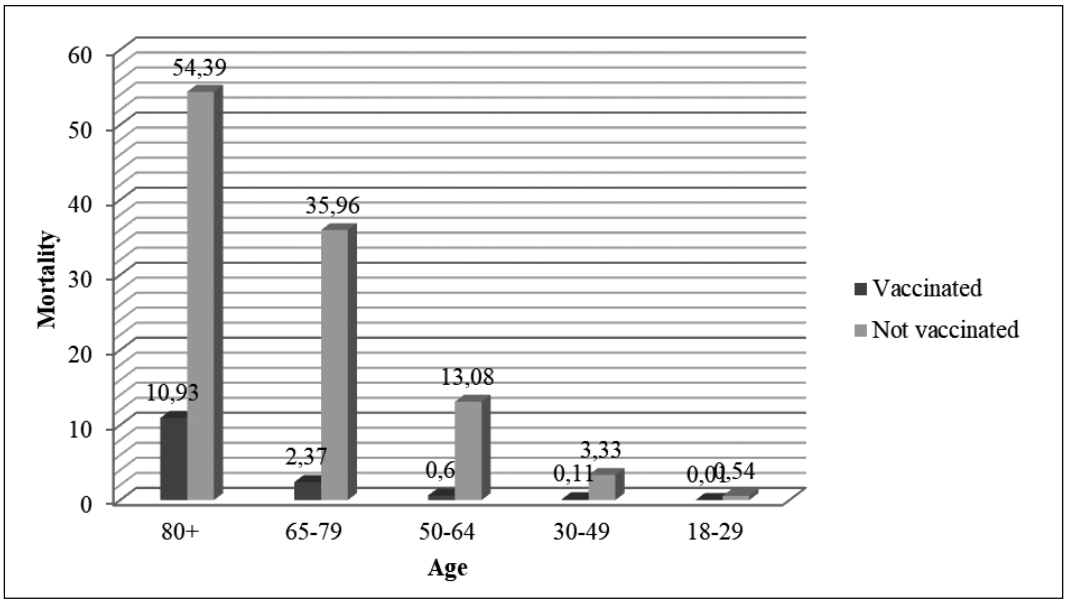

Fig.4. Mortality of vaccinated and unvaccinated persons during the course of illness caused by the COVID-19 virus

literature and systematizing the results, we formed five groups of vaccine refusal factors (Fig.1) [7-10].

Of course, there are other factors too. A recent Oxford University study found that fear of the needle is a major barrier for almost 10% of the population. But the above model covers the most common causes of fluctuations [11].

Vaccination is a form of medical intervention and is performed not for the purpose of diagnosing a disease or its treatment, but in order to prevent the possible occurrence of an infectious disease. Therefore, this problem, like no other, is related to issues of biomedical ethics. The ethical standard of the medical profession, expressed in the «Do No Harm» formula, requires doctors to do everything in their power to avoid the adverse consequences of any medical intervention.

Therefore, when carrying out vaccination, the unconditional professional duty of a doctor lies in an individual approach to each patient. However, in pediatric practice, it is much more difficult to do this, since the doctor mostly deals not with the patient himself, but with his representative, most often the parent. The latter can act as both a positive and a negative factor influencing the results of interaction. Thus, the social aspect of vaccination becomes a subject of discussion that goes beyond the professional competence of physicians into the field of issues requiring philosophical, legal and ethical expertise[12].

So, today, most scientists identify the following psychological barriers to a full-fledged vaccination against COVID-19 [16]:

1. Lack of awareness of the importance of vaccination in the context of the risk of disability or loss of life.
2. Fear of needles and other invasive medical procedures.
3. Feeling of helplessness and hopelessness before the epidemic, where the vaccine is considered absolutely ineffective.
4. Distrust of the components of the vaccine.
5. Feelings of mistrust towards modern technologies and policies of international organizations.

As can be seen, according to the analysis of most scientific sources, today it is customary to distinguish five main groups of reasons for refusing vaccination.

After we have conducted a theoretical analysis of the most relevant and advanced scientific literature on the main reasons for refusal of vaccination and the psychological barriers that exist, it is important to conduct a practical survey of ordinary citizens about how ready they are for vaccination and, in case of refusal of the latter reason, for which they refuse to be vaccinated.

This survey was conducted on the territory of Ukraine in the outpatient clinic of family medicine. 30 respondents took part in the survey. The reason for choosing such a limited number of respondents was that the survey was conducted in the midst of the COVID-19 epidemic. In addition, in order to comply with all ethical standards and permissions of the management of the outpatient clinic, the number of respondents was limited to 30 respondents.

Among which were different representatives by gender and age groups. The entire interview process was conducted in accordance with the ethical rules of the interview process. All data obtained during the survey was used for scientific purposes only. All personal data of the respondents, at the request of the latter, remained anonymous. It should be noted that the sample of respondents consisted exclusively of those citizens who had no absolute and relative contraindications to vaccination.

During the survey, respondents were asked the following questions:

1. Do you plan to get one of the COVID-19 vaccines?
2. If the answer is «no», indicate the reason for not vaccinating out of the five given.

After the survey, all respondents gave their informed consent to the use of their answers in the process of this research. The whole research process was agreed with the administration of the family medicine clinic.

RESULTS

After conducting a theoretical analysis and a practical survey of respondents in a family medicine outpatient clinic regarding their attitude to vaccination of one of the vaccines against

COVID-19, and, in case of refusal of the latter, identifying the reason for refusal to vaccinate, we systematized all the answers and, for the convenience of displaying the received results are shown graphically.

As we can see from Fig.2. 72% of respondents have a positive attitude towards vaccination and are aware of the social importance of the COVID-19 vaccination process as the main measure to combat the pandemic. However, 21% of those surveyed showed a negative attitude towards vaccination, while 7% have not yet reached a final opinion on their attitude towards the COVID-19 vaccination process.

In order to find out the main reasons for the refusal of vaccination, those respondents who revealed a negative attitude towards the vaccination process were asked to choose the main reason for the refusal of vaccination among five existing groups. Fig.3. shows the answer to the question: « What is the reason for your refusal to be vaccinated?».

How can we create from Fig.3. the majority of respondents point out that the main reason for refusing to vaccinate is a lack of confidence in the vaccination process and doubts about the safety of the vaccine.

In our opinion, the reason for choosing such a factor of refusal to vaccinate is that the COVID-19 vaccines, like the disease itself, have appeared relatively recently, and, in the opinion of a large number of ordinary citizens, have not yet had time to pass all possible tests and safety and reliability studies.

But, despite the existing myths and warnings, today statistics show that vaccination was and is the only way out of the pandemic situation. Thus, according to the CDC [13], vaccination against COVID-19 is a powerful factor in reducing mortality in all age categories (Fig. 4).

Fig.4. it can be seen that in all age categories, the mortality of the vaccinated is significantly less than that of the unvaccinated, which can be affirmative evidence of the safety and reliability of the vaccine and the reason for increasing confidence in it.

Considering the results obtained, we can say that for today, vaccination, especially in the context of the current COVID-19 pandemic, is the only possible and available method to combat the pandemic. Despite significant amounts of information about the severity of the course, high mortality, both in Ukraine and around the world, a certain part of the population refuses to receive vaccinations against COVID-19, creating a significant threat of strengthening and continuing the pandemic. Given that the main reason for refusing to vaccinate is an insufficient level of trust and doubts about the safety of the vaccine, in our opinion, the main way to overcome this refusal factor is to strengthen the educational work of medical institutes, medical organizations at international and national levels in the vector of conveying information about the safety of vaccines to the population and that lack of vaccination is a factor in the increased mortality rate during illness.

DISCUSSION

In a pandemic, it is important to protect yourself and not die from COVID-19, for which there is no cure. Therefore, it is desirable for teachers to be vaccinated as soon as possible, especially since teachers are classified as priority groups for vaccination in our state. In addition, your opinion is authoritative for people in your environment, and your example positively influences the decision to get vaccinated. Most likely, friends, acquaintances and parents of pets, students or students will look up to you and also want to protect themselves from COVID-19.

Each country has its own regulatory authorities that monitor the safety and efficacy of vaccines before they are widely used. Around the world, WHO coordinates a number of independent technical bodies that test the viability of vaccines before and even after they are introduced. Vaccines approved for use by the WHO have passed rigorous tests and clinical trials to prove they are safe and effective in dealing with the pandemic.

The issue of refusing to vaccinate today is becoming a priority and affects not only the medical system, but the entire system of social security of the countries of the world[14].

The issue of identifying the reasons for refusal to vaccinate against COVID-19 was investigated with the development and introduction of vaccines into medical practice. For example, scientists Ivanov and Petrov conducted a similar survey in their research and found that the main reasons for refusing to vaccinate are the following: side effects and effectiveness of the vaccine; purported benefits, including immunity, reduced fear of infection, and protection of self and the environment. In our opinion, such a list of causes is not systematized and does not make it possible to further develop mechanisms for effectively counteracting these failures[15].

Even a vaccinated person can contract COVID-19. The goal of vaccination is to effectively prevent severe disease, complications and death. Having been vaccinated, a person, even if he gets sick, will endure the disease more easily: most likely he will not need oxygen therapy and will not go to the hospital.

All vaccines approved for use by WHO are highly effective in preventing severe COVID-19 disease, hospitalization and death.

CONCLUSIONS

Vaccines are one of the most effective public health practices in promoting health and reducing the burden of infectious diseases. They also make a significant contribution to social and economic development, not only in terms of health protection and mortality reduction, but also in terms of poverty reduction, equity, production, education and the strengthening of health systems in general. Vaccines are extremely safe. However, the safety of vaccines is receiving increased attention from the public, and rightly so.

We can talk as much as you want about the safety of the vaccine, but it will not help to eliminate such fears and ultimately affect people's behavior. It was previously thought that people were either unequivocally in favor of vaccines or against them. Most really have nothing against vaccination: according to the WHO, depending on the type of vaccine, 9 out of 10 people support immunization. There are also groups in the population who are strongly opposed to vaccination and cannot be persuaded. Usually, such people have long held alternative views on health care. Recently, however, distrust of vaccines among the population has begun to increase. People are becoming more and more reluctant to be immunized, and some are becoming relentless opponents of vaccines.

To find out the attitude and possible psychological barriers of citizens to vaccination, we conducted a theoretical analysis and a practical survey of respondents in the family medicine outpatient clinic. As a result of the study, it was found that most scientists identify five main groups of factors and barriers to refusing to be vaccinated. As a result of the survey, it was revealed that the majority of respondents who showed a negative attitude towards vaccination against COVID-19 chose the lack of trust and doubts about the safety of the vaccine as the reason for the refusal.

In our opinion, the reason for choosing this factor is that these vaccines, like the virus itself, have not been around for so long, and, according to the population, have not had time to pass all the reliability and safety tests. However, the statistics presented in the study confirm the fact that vaccination against the COVID-19 virus is currently the only way to overcome the global pandemic and significantly reduces the mortality rate during the disease.

This study has its limitations, since the survey was conducted on the territory of Ukraine and may take into account the peculiarities and dynamics of the vaccination process in this particular territory. In addition, the survey was conducted among the population, not counting the age indicator, since the goal was to identify the most common reasons for refusal to vaccinate. In future studies, the authors plan to investigate more specific factors and psychological barriers to vaccine refusal among different ages.

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Conflict of interest:

The Authors declare no conflict of interest.

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Received: 19.02.2022
Accepted: 25.07.2022

A – Work concept and design, **B** – Data collection and analysis, **C** – Responsibility for statistical analysis, **D** – Writing the article, **E** – Critical review, **F** – Final approval of the article