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## **Vaccination as an element of health security management - analysis of factors of patient attitudes towards COVID-19 preventive vaccinations based on the opinions of healthcare experts**

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## **Abstract**

**Background:** Preventive vaccinations play a significant role in reducing the spread of infectious diseases. They mitigate the course of infectious diseases and limit the occurrence thereof. Thus, they allow maintaining the health security of citizens and are one of the activities that allow for effective population health management. However, even though vaccinations bring significant benefits to the population as a whole, the attitudes of individuals to them raise a number of controversies.

**Objective:** The aim of the study was to analyze the characteristics and factors of patient attitudes towards COVID-19 preventive vaccinations based on the opinions of healthcare experts. The study was carried out in the framework of a project "The interdependence of lifestyle and attitudes towards COVID-19 preventive vaccinations", which finished in June 2023.

**Method:** The research method was an in-depth telephone interview with experts who had previously studied the research problem and the results of quantitative research, and expressed individual opinions on the factors of patient attitudes towards COVID-19 vaccinations. The experts indicated various factors which, in their opinion, can influence patient willingness to be vaccinated against COVID-19. In the research process, four main factors were found: patient social environment and patient experience; patient knowledge and awareness, social impact (message of medical authorities and political decision makers), balance of benefits and risks.

**Results:** The results obtained in the study and the conclusions drawn show the need for further, in-depth research in patient attitudes towards preventive vaccinations, not only COVID-19 vaccinations.

**Keywords:** vaccinations; health management; society

## **Background**

Protective vaccinations are considered one of the greatest achievements of modern medicine, next to hygiene and antibiotics. Vaccinations have significantly contributed to controlling [1], and limiting the spread of infectious diseases; and alleviating the symptoms thereof. The first vaccine, which was created in 1796, allowed for the complete eradication of smallpox. Subsequent vaccines allowed for the successive elimination of infectious diseases such as tuberculosis, pertussis, tetanus, epidemic typhus, yellow fever, hepatitis A and B, and influenza.

The invention of vaccines is crucial for the elimination of infectious diseases, but the actual vaccination coverage in the population is equally important, and it depends on many factors [2].

From the perspective of management in healthcare, the role of preventive vaccinations is multifaceted and vital. It encompasses not just the direct health benefits to individuals but also broader implications for public health, resource allocation, and strategic planning within healthcare systems. Vaccinations are a critical tool in preventing the spread of infectious diseases. By reducing the incidence of vaccine-preventable diseases, healthcare management contributes to overall public health improvement. What's more, preventive vaccinations are generally more cost-effective than treating the diseases they prevent. For health care managers, who are obliged to allocate resources efficiently, investing in vaccination can reduce long-term health care costs, preventing costly epidemics and reducing the need for costly treatment.

Many countries implement a vaccination model based on mandatory vaccinations or recommended preventive vaccinations. In the Polish legal system, vaccinations are divided into two categories: mandatory vaccinations and recommended vaccinations. The main document on vaccinations in Poland is the Protective Vaccination Program [3]. The document is updated annually by the Polish Chief Sanitary Inspectorate. It is published in the Official Journal of the Minister of Health by October 31 of the year preceding its implementation as an Announcement of the Chief Sanitary Inspector on the Preventive Vaccination Program for the subsequent year. The Protective Vaccination Program includes a calendar of mandatory vaccinations that are fully reimbursed and a list of recommended vaccinations that are co-financed by a patient. There are two groups of patients subject to mandatory vaccination: children and adolescents by age group and persons at particular risk of infection.

Vaccination against COVID-19 deserves particular attention. This vaccination was not included in the Protective Vaccination Program, but it was mandatory for medical professionals, pharmacists, medical students and employees of medical entities pursuant to the Regulation of the Minister of Health of 20 March 2020 regarding the announcement of the state of epidemic in the territory of the Republic of Poland [4].

Even though the COVID-19 vaccination was recommended, many persons questioned its necessity and decided not to be vaccinated. As of July 28, 2023, the number of fully vaccinated persons in Poland was 22,648,826 [5], which was less than 60% of the population. By comparison, the percentage of those fully vaccinated was 87% in Brazil, 84% in Italy, 81% in France, 72% in Turkey, and 69% in Kenya.

In the light of the above, a question arises about the factors that influence patient's decision to undergo a vaccination. Salvador Casara, Bruno Gabriel, et al. [6] performed a study in 2020 on the impact of potential factors of vaccinations, which included:

- recognition of the risk of contracting a disease (the greater the certainty that the risk of contracting the disease is low/lower than in other persons, the lower the willingness to be vaccinated),

- trust in science/scientists (trust in experts' knowledge on how to create and test the vaccine increased the trust in research and resulted in a greater willingness to be vaccinated),

- unrealistic optimism (belief that other persons are more likely to be infected results in lower willingness to be vaccinated),

- belief in conspiracy theories (questioning the credibility of scientists and the belief that scientists have hidden goals reduce patient willingness to get vaccinated).

In 2022, Polish radio RMF FM and newspaper *Dziennik Gazeta Prawna* commissioned United Surveys to conduct a survey in Poland based on a question: "Why don't you want to get vaccinated?" [7]. The following factors were indicated:

- safety of vaccines - Poles who refused to get vaccinated against COVID-19 believed that vaccines were not safe,

- belief that there was no pandemic,

- lack of trust in science

- lack of trust in government

- belief that vaccination means limitation of personal freedom,

- environment - those unwilling to get vaccinated knew someone who was "harmed" by the vaccination, or their families and relatives were against vaccination.

The authors' study "The interdependence of lifestyle and attitudes towards COVID-19 preventive vaccinations" (2023), the partial results of which are presented in this article, focused on the following factors:

- socio-demographic characteristics: age, sex, education and socio-economic status,

- health condition,

- healthy lifestyle: human activity that generally includes a specific diet, avoiding tobacco and alcohol, physical activity and the ability to fight stress [8],

- adherence principle which means "active, voluntary and joint involvement in acceptable behavior in order to achieve a therapeutic outcome" [9].

In the light of the above, in-depth interviews were conducted with healthcare experts who were asked to indicate the factors that, according to their knowledge, influence patient

willingness to be vaccinated against COVID-19, as well as to interpret the previously obtained survey results.

## **Objective**

The study aims to analyze the characteristics and factors of patient attitudes towards COVID-19 preventive vaccinations based on the opinions of healthcare experts.

## **Material and method**

The study was carried out in the framework of a project "The interdependence of lifestyle and attitudes towards COVID-19 preventive vaccinations", which finished in June 2023 and was conducted using the telephone depth interviews (TDI), which involve a telephone conversation with a respondent. The interview is conducted by a properly trained person. During the conversation, the interviewer uses a list of questions; however, they can adjust the conversation to the knowledge and competence of the respondent to get detailed information. Thus, the conversation is partly structured, and the respondent is free to express their thoughts and focus on individual topics. The role of the interviewer is to lead the conversation in such a way that the respondent provides the most comprehensive information.

The aim of the interviews was to explain the phenomena observed in the survey conducted among the patients of Centrum Medyczno-Diagnostyczne in Siedlce (Medical and Diagnostic Center in Siedlce), Poland. The following questions were included in the survey:

1. What factors could determine one's willingness to get vaccinated against COVID-19?  
What factors can influence a positive and a negative decision on vaccination?
2. The survey showed that the following persons were more likely to be vaccinated: (i) women, (ii) the elderly, (iii) chronically ill, (iv) persons who led a less healthy lifestyle as compared to general population, (v) persons who did not work (pensioners / disability pensioners). In addition, in the group of professionally active persons (vi), office workers were more likely to get vaccinated, and in the group of healthy persons (vii), those undergoing screening tests were more likely to be vaccinated. Do all of the above mentioned characteristics affect patient's decision to get vaccinated against COVID-19, or do the impacts of some of them overlap?
3. How do the factors that you considered significant for the willingness to be vaccinated against COVID-19 in the previous question influence the decision to get vaccinated?  
What decision-making mechanism can you see?

4. The multi-factor model shows that only the following factors decide about the willingness to get vaccinated against the COVID-19: sex, age and a healthy lifestyle. Health condition and professional status were found to coexist with age and lifestyle. Do you find it possible?
5. The results of the survey show that these groups of persons lead a healthier lifestyle than the others: (i) healthy, (ii) unvaccinated, (iii) educated, (iv) in relationships, (v) persons under 75 years of age. Do you think all these factors matter or do the impacts of some of them overlap?
6. How do the factors that you considered significant in the previous question influence lifestyle? What decision-making mechanism can you see?
7. The multifactor model explains that the determinants of a healthy lifestyle are (i) education, (ii) relationship status, (iii) not being vaccinated. Health condition and age are found to coexist with the lack of vaccination. Do you find it possible?

Experts from the health care sector were invited to the study, considering seniority, experience and diversity of employment in the health sector. Some experts had direct contact with patients during the pandemic, and some were responsible for the organization of health care entities and management of public health processes. Participants to the study were:

- 1) Three academic workers, including one professor and two assistant professors;
- 2) Two family medicine doctors who also deal with health education;
- 3) Two primary health care physicians;
- 4) Two managers of medical entity;
- 5) Nurse.

10 interviews were conducted in May and June 2023.

## **Results and Discussion**

The results obtained in the research provided information in three areas subject to analysis:

1. Reasons for performance and non-performance of vaccinations against COVID-19.
2. Identification of patient decision-making mechanisms.
3. Influence of lifestyle on the decision to get vaccinated.
4. Impact of adherence on the decision to get vaccinated.

### ***Reasons behind performance and non-performance of COVID-19 vaccinations***

In the first question, experts were asked to list factors which, in their opinion, affect the willingness of the Polish people to be vaccinated against COVID-19. They indicated various reasons, which, in general, can be divided into four categories.

One of the factors that affect patient's willingness to undergo a vaccination is the influence of the patient's social environment experiences accompanied by the patient's own experience. Based on their professional experience, experts noted that patients whose family members were vaccinated were more likely to be vaccinated. The willingness to be vaccinated was also influenced by the negative experiences of patients or their relatives: severe COVID-19 disease, disease complications, and death. Such experiences aroused fears, and motivated for vaccination. Some patients were driven by concern about others, rather than concern about their own health.

The second factor indicated by the experts was patient's knowledge and awareness, regarding for example the disease process, i.e. having knowledge about how the virus works and who it attacks. The experts agreed that having reliable knowledge about vaccinations fostered the willingness to undergo a vaccination, but the patients had various sources of the knowledge. According to some experts, access to information is of key importance. Persons who had access to scientific knowledge and were able to acquire it were more likely to get vaccinated, whereas those who had access to websites that questioned vaccinations rejected vaccinations. One of the experts was of the opinion that having knowledge about health is related to education, while another expert believed that it is related to the ability to understand socio-political processes (there are persons who do not trust authorities as a rule, question their theoretical justifications, and can see a conspiracy theory everywhere).

The third factor was social influence, which covered both the activities of medical authorities and political decision makers. The key aspect of social influence is trust in the health care system and its representatives. These are not only doctors and nurses, but also the authorities including the representatives of the Ministry of Health. In one expert's opinion, trust is the effect of socialization (some people trust strangers and others do not), and in another expert's opinion, it is related to the functioning of the cognitive apparatus (people hold views that they consider their own, although in fact they result from cognitive errors). Yet another expert expressed an interesting belief that the reason for not having vaccinations is defiance: people want to feel empowered and to be able to refuse something, even if they know that the refusal will be harmful for them. According to some experts, the wrongly delivered media messages were detrimental to patients' willingness to have vaccinations. Patients' behavior may

also have been influenced by the ‘naive’ message that they had received. Most persons did not believe that a one-time vaccination would save everyone, as it was reported in the media, although they intuitively understood that it would save some of them.

The fourth factor affecting vaccination coverage was the balance of benefits and risks, which was also indicated by the patients in their interviews. This factor was indicated by only two experts. In their opinion, in order to get vaccinated, the patient had to believe that the vaccination would bring more benefits than risks, and in the event of complications, they had to be sure that they would be paid compensation by the state. The main factors that were considered by patients were age and the number of chronic diseases. This approach perfectly explains the attitude of young patients, who remembered the media message that COVID-19 was dangerous mainly for the elderly and the sick. The benefits of preventive vaccination did not balance the risk of vaccination with an insufficiently (in their opinion) studied preparation. Another aspect of the balance of benefits and risks were restrictions for the unvaccinated persons. This is why, persons who wanted to travel, have social contacts and keep a job that required vaccination were more likely to be vaccinated.

### ***Patient decision-making mechanisms***

After they had shared their opinions on patients’ reasons behind the performance/non-performance of vaccinations, the experts were asked to interpret the results of the patient surveys. They considered that all the above-mentioned characteristics are important in general (questions 2, 3, and 4 of the questionnaire), but while interpreting the results, they mainly referred to the previously expressed opinions.

The respondents focused mostly on the age of patients. They believed that the elderly and those chronically ill felt more at risk, and they were under the influence of their families who persuaded them to get vaccinated. Experience was mentioned in the interviews, too. The elderly have seen many tragedies caused by infectious diseases, which has also influenced their decision to get vaccinated. Young persons were confident and showed the “I won’t get sick” attitude, and they were more afraid of post-vaccination complications than the disease itself. According to the experts, the age of patients determined high susceptibility to conspiracy theories. In addition, young persons showed superficial activities: they preferred dietary supplements to vaccinations.

A few experts indicated that women were more likely to be vaccinated against COVID-19 than men. The experts noticed that women used health services much more often than men, and men reported to doctors later than women. It was explained that women were vaccinated more frequently than men because they are more responsible, which results from the need to

take care of the family. Women are the ones who encourage men to take preventive measures and this may explain why being in a relationship affects the desire to get vaccinated.

Education seemed controversial to the experts. Some of them were of the opinion that educated persons have better opportunities to obtain reliable information about vaccinations and therefore they are more willing to get vaccinated. Other experts indicated that educated persons show greater trust in the health care system. However, this results from patient experience: educated patients use medical services more often, and thus they experience positive effects of healthcare services.

Some of the surveyed experts were surprised by the results of surveys on a healthy lifestyle. It was surprising that persons who led a healthy lifestyle were less likely to get vaccinated. The interviews showed that this group of patients understood the concept of a healthy lifestyle very broadly, also as regular prevention and medical services. After they had defined the concept of lifestyle, experts concluded that persons who are less health-conscious were vaccinated out of the fear of the consequences of the disease. Passive attitude of persons leading an unhealthy lifestyle was another explanation. In the opinion of this group of patients, health care system should take care of their health. According to the experts, patients who undertook preventive activities were vaccinated because of their health-consciousness. Healthy persons who undertook preventive activities were more likely to be vaccinated because they were used to having this type of medical services.

#### ***Verification of patient decision-making mechanisms***

When discussing the issue of the overlapping of the impacts of various factors, the experts agreed that the age is correlated with the occurrence of diseases, professional status, and an unhealthy lifestyle. Therefore, health condition, lifestyle and professional status can only coexist in the correlation with age and willingness to be vaccinated. The above conclusion is controversial, because lifestyle turned out to significantly shape patient willingness to be vaccinated, regardless of gender and age.

According to some experts, the balance of benefits and risks is of key importance and the results should be interpreted through the prism of this phenomenon. Under this assumption, the less health-conscious and chronically ill patients were vaccinated out of fear. Patients who regularly undertook preventive activities got vaccinated because of their awareness.

According to the respondents, women are naturally more responsible. This is due to the behavioral sense of responsibility for others and it explains an increased vaccination rate among women and among couples.

### ***Factors of patient healthy lifestyle***

The experts were asked to identify the factors affecting a healthy lifestyle and to explain the interdependence between a healthy lifestyle and the characteristics of patients. The experts were reluctant to refer to the latter issue. This was probably due to a partial misunderstanding of the concept itself. As a consequence, when asked about a healthy lifestyle, they generally referred to the issue of vaccination against COVID-19. The factors shaping a healthy lifestyle of patients was raised by only three experts.

The three experts who answered the question about the factors shaping the patients' healthy lifestyle focused on smoking. One of the experts was of the opinion that if someone has been smoking cigarettes for many years, they are aware that they do not have a healthy lifestyle and they resign from healthy activities in other areas as well. Another expert believed that if someone is so irrational as to smoke cigarettes, they are not aware that it is worth leading a healthy lifestyle. The third expert was wondering if the relation could be reversed: perhaps the lifestyle influenced how long a person has been smoking cigarettes.

Another factor indicated by the experts was the correlation between the lifestyle and the level of education of patients. The respondents agreed that a higher education facilitates the acquisition of knowledge about what should be done to live a healthy life. According to one expert, awareness may also be related to age. With age, the frequency of reporting to primary health care increases, which is why elderly persons have a greater awareness in the area of health care.

The experts agreed that being in a relationship has an impact on a healthy lifestyle. This relationship has been confirmed, as the risk of certain diseases (e.g. cardiovascular diseases) is higher in singles. Experts were of the opinion that women, being more responsible persons, motivate their partners to undertake preventive activities and lead a healthy lifestyle. One of the respondents expressed the opinion that having children is more important than being in a relationship, which also motivates patients to take care of themselves.

## **Conclusions**

The rapid and extensive vaccination campaign during the COVID-19 pandemic revealed how important it is to obtain social approval for vaccinations. Concerns and frequent media discussions about them have increased interest in the determinants of vaccination decisions.

For healthcare managers, both policy makers and managers of medical entities, understanding the determinants crucial for successful population vaccination is extremely important. This knowledge enables them to design and implement effective vaccination

programs in future, ensuring higher rates of vaccine uptake and thereby improving public health outcomes. Also, such analysis will help adjust communication and public education strategies to increase public understanding and acceptance of vaccination.

Studies aimed at the identification of factors affecting the willingness or lack of willingness to have a vaccination were conducted during the vaccination campaign and after it finished, and they revealed the following factors:

- trust or lack of trust in the health system and decision makers,
- potential benefits and risks for those vaccinated,
- environment and disease-related experiences,
- age.

In the interviews, the experts suggested extending the analysis of quantitative data obtained in the patient survey. It is worth analyzing the relationship between gender and the age with regard to the willingness to get vaccinated. Women live longer and therefore, on average, they are older than men. Thus, it is possible that it is not age but gender that is the determining factor. When discussing the impact of being in a relationship on the willingness to get vaccinated and have a healthy lifestyle, gender is also worth considering. Perhaps the influence of women on male attitudes is greater than the influence of men on female attitudes.

In conclusion, it is worth including additional aspects in further research such as having children, political views, patients' religious beliefs, and selected psychological characteristics of patients (e.g. the level of fear of COVID-19, the level of fear of vaccinations, the level of paranoia).

Due to the complexity of the topic of vaccinations, the high skepticism of Polish patients towards vaccinations and potential future epidemic threats, the continuation of research on this topic seems to be necessary.

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