



Research Article

Sociodemographic Determinants of Covid-19 Vaccination Non-Acceptance in Adults. A Cross Sectional Study

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Abstract

Purpose: The achievements of vaccinations have become increasingly more appreciated over the years. However, non-acceptance of vaccination raises many questions and complicates the work of health authorities to limit pandemic diseases.

Methods: A cross sectional study was design. 544 adults filled in an anonymous online questionnaire evaluating knowledge and approval of Covid-19 disease, between December 2020 and January 2021. Two-tailed statistical significance was set at $p \leq 0.05$. Data analysis was performed with SPSS 25.0.

Results: 36.7% of the participants stated that they do not wish to be vaccinated. Factors like fear of possible side effects (33.3%), concern and doubt over the rapid development of the vaccine (32.3%) and other reasons deter people from getting vaccinated. Women reported being more worried about adverse effects of the vaccine ($p=0.005$), compared to men. People <30 years old believe that Covid-19 vaccine will probably cause serious health issues ($p=0.002$), agree with the view that it is better to be vaccinated later in the future in order to better assess the effectiveness of the vaccine ($p=0.005$) and prefer natural infection over vaccination ($p=0.003$).

Conclusions: In the present study, only a small degree of Covid-19 vaccination willingness is observed within the study population. People who wish to get vaccinated are women above 30 years of age, with higher education level. The main reasons behind vaccination reluctance are possible side effects and the fear of induction of serious health issues.

Keywords: Covid-19; Vaccination; Non-Acceptance; Adults; Age;

Introduction

From Edward Jenner in 1796 to this day, the scientific and research community has recognized the importance as well as the benefits of vaccination [1]. Immunizing the population against virulent factors has effectively contributed to managing chronic health problems, preventing diseases, avoiding or mitigating epidemics, reducing child mortality and improving people's quality of life [2].

The basic principle of vaccination is the induction of immunity against an infectious agent by taking advantage of the immune system's natural response. People receive a microorganism antigenic parenteral or oral route and stimulate the body's immune ability to create antibodies [3]. Potential future contact with the infectious strain will trigger an immune response, meaning that the person will either not show any symptoms of the disease or will only show mild symptoms, thus vastly reducing relapse and death rates [4].

The achievements of vaccination are impressive and have become increasingly more appreciated over the years. The CDC estimates that 2,500,000 deaths in children <5 years are prevented each year by vaccines worldwide. With the widespread use of vaccines, smallpox has been eradicated, polio is approaching eradication, deaths from measles have declined by 75% since 2000, and deaths from tetanus have declined by 90% over the last 20 years. Influenza vaccination reduces the risk of developing the disease by 40-60% and during the period 2019-2020, it prevented around 7.5 million diseases, 3.7 million medical visits, 105,000 hospitalizations, and 6,300 deaths related to influenza [5, 6].

Despite the significant and positive benefits of vaccination, many people are negative, averse or opposed [7]. "Vaccine hesitancy" is a relatively new term that describes the person who does not wish to be vaccinated or doubts the importance of vaccination or urges others not to be vaccinated. The main reasons associated with vaccine hesitancy are related to personal beliefs, religious reasons, vaccine safety concerns, and health literacy [8, 9].

The percentage of parents who refuse to vaccinate their children is constantly increasing. This results in the emergence of acute health conditions from strains such as Hemophilus influenzae type b or whooping cough as well as the spread of diseases that had been eliminated or contained such as measles and chicken pox. The percentage of unvaccinated children varies from country to country and ranges from 1% to 30% [7-9].

The development and distribution in the market of a vaccine to contain and better manage Covid-19 disease, in a relatively short period of time, was described by many as a scientific achievement

of our times because of the nature and special characteristics of the virus. The arrival of the vaccine was a pleasant announcement that brought relief to the largest part of the population. According to Khichadi et al [10]. 79% of American citizens are willing to be vaccinated while a similar study in America by Reiter et al [11]. shows that 69% of study participants wish to be vaccinated. Despite the criticality of the disease, a percentage of 20-30% is negative to vaccination. According to the researchers, a percentage of 15% of the population is very likely not to be vaccinated, while 7% will definitely not.

The non-acceptance of vaccination raises many questions and complicates the work of health authorities to limit pandemic diseases. The economic costs for both patients and the health care system are constantly increasing, particularly when disease complications or disability occur. The purpose of the study was to investigate the factors that influence the non-acceptance and negative attitude towards vaccination for the Covid-19 disease.

Materials and Methods

A cross-sectional study design was chosen for the purpose of this study. The reason behind this choice was the credibility of the results produced since it is considered to be the most appropriate type of study for collecting data from many participants.

The study was carried in a convenience sample of 544 people of 18 years of age and above. The people questioned were first informed over the purpose of the research, protection of anonymity and voluntary participation, and then were called to fill in an anonymous online auto-fill questionnaire. This study was conducted from 1/12/2020 until 31/1/2021.

To ensure the validity of the content of the questionnaire, relevant Greek and international literature was reviewed. After meticulous critical reading of the literature, no scale that evaluates knowledge and approval of Covid-19 disease was found. As a result, the development and pilot testing of such type of scale in Greek language and in a population of 15 people was considered useful in order to assess the validity and reliability of the questionnaire [12].

The internal consistency (reliability) of the questionnaire represents the extent to which subparts of the questionnaire measure the same characteristic. Reliability assessments extremely useful because it serves the evaluation of the questions and by extension, the evaluation of the answers.

The validity of the questionnaire represents the extent to which a questionnaire measures what it was designed to measure. The measurements need to be relevant to the characteristics the researcher wants to study. The different types of validity that were examined in this questionnaire were face validity and content validity.

The final structure of the questionnaire included of 8 questions on people's knowledge about transmission, manifestation and prevention of Covid-19 disease, 10 questions on information

sources, 10 questions to investigate the trust and acceptance of scientific data related to the disease, 10 questions to investigate the influence of social environment in accepting the disease and 10 questions to investigate the attitudes and preferences over vaccination. The Cronbach's coefficient was 0.68 showing borderline internal consistency.

In the present study, descriptive and inferential statistics were employed. The presentation of the descriptive results was performed with the use of percent distribution, average values, and standard deviation. Inferential statistics was chosen considering the importance of the results and for that reason independence tests were conducted with parametric tests, since the data followed a normal distribution. Specifically, Student's t-test was applied for binary variables because the larger the sample, the more the distribution resembles normal distribution shape and for variables with 3 or more values, analysis of variances was chosen in order to control for the impact of 2 or more independent variables on the dependent variable. Two-tailed statistical significance was set at $p \leq 0.05$. Data analysis was performed with SPSS 25.0 (Statistical Package for Social Sciences).

Results

The majority of the sample were female (82.0%). Regarding age, 50.6% were over 30 years old and 49.4% were under 30 years old. Almost all had Greek nationality (97.6%) and in terms of educational level, most participants were University graduates (43.0%), 17.5% of which held a master's degree and 2.2% held a PhD. Most participants were employed (90.3%) and regarding their marital status, 30.7% were married, 65.1% single, 3.3% divorced and 0.9% widowed. Lastly, 82.7% lived in a city, 9.7% in a small town and 7.9% in a village.

Regarding the willingness of the sample to receive vaccination against Covid-19, 36.7% of those questioned stated that they do not wish to be vaccinated, 21.7% showed average willingness and 41.6% showed strong willingness. Factors like fear of possible side effects (33.3%), concern and doubt over the rapid development of the vaccine (32.3%), fear that the vaccine might induce serious or incurable health conditions (29%) and the lack of agreement between scientists (25.8%), deter people from getting vaccinated, while 50.5% recognizes that vaccination is

an effective measure of prevention and better management of the disease.

As for vaccination administration, 50.5% agree with the view that it is preferable to be vaccinated later in the future so as to better assess the effectiveness of the vaccine, 42.1% wants to be vaccinated even if their doctor doesn't recommend it, 44.5% does not agree with the view that Covid-19 vaccination should only be performed on vulnerable population groups and not on the general population and lastly, in relation to the knowledge of healthcare workers on vaccination, 48.6% stated that healthcare professionals have good knowledge of vaccination administration, 36% stated average knowledge and 15.4% believe that healthcare providers have incomplete knowledge of Covid-19 vaccine administration.

Regarding sex, a statistically significant difference was observed between men and women. Specifically, females report being more worried about adverse effects of the vaccine ($p=0.005$), compared to men.

People in the age group >31 years wish to receive vaccination for the disease ($p=0.001$) and believe that healthcare professionals have all the necessary knowledge to administer the Covid-19 vaccine ($p=0.001$). On the contrary, people <30 years of age believe that Covid-19 vaccine will probably cause serious or incurable health issues ($p=0.002$), agree with the view that it is better to be vaccinated later in the future in order to better assess the effectiveness of the vaccine ($p=0.005$), prefer natural infection by Covid-19 over vaccination against it ($p=0.003$) and believe that Covid-19 vaccination should be performed only on vulnerable groups and not on the general population ($p=0.006$)

In respect to education, we observed that the higher the education level is, the stronger the willingness to get vaccinated is ($p=0.001$) and the more people show trust towards healthcare workers' knowledge of vaccination ($p=0.001$). In contrast, as the education level lowers, a rise is observed in the fear of vaccine side effects ($p=0.001$) and of developing serious or incurable health conditions ($p=0.001$), and there is increased agreement with the views that it is better to be naturally infected by Covid-19 than to be vaccinated against it ($p=0.001$) and that vaccines should be administered only to vulnerable population groups ($p=0.001$) (**Table 1**).

	Sex	p-value	Age	p-value	Level of education	p-value
I want to be vaccinated against Covid-19 disease.	Female	0.083	>30 Years	0.001	Compulsory	0.001
	Male		<30 Years		Middle	
					Upper	
I am worried about possible side effects of the vaccine.	Female	0.005	>30 Years	0.095	Compulsory	0.001
	Male		<30 Years		Middle	
					Upper	
The rapid development of the vaccines makes me feel insecure and worried about its safety.	Female	0.269	>30 Years	0.182	Compulsory	0.074
	Male		<30 Years		Middle	
					Upper	
The lack of agreement between scientists has a deterrent effect on vaccination of the whole population.	Female	0.091	>30 Years	0.001	Compulsory	0.081
	Male		<30 Years		Middle	
					Upper	
Health professional have the necessary knowledge to administer the Covid-19 vaccine.	Female	0.340	>30 Years	0.001	Compulsory	0.001
	Male		<30 Years		Middle	
					Upper	
The Covid-19 vaccine probably induces serious or incurable health conditions.	Female	0.637	>30 Years	0.002	Compulsory	0.001
	Male		<30 Years		Middle	
					Upper	
I agree with the view that it is preferable to get vaccinated later in the future to better assess the effectiveness of the vaccine.	Female	0.189	>30 Years	0.005	Compulsory	0.154
	Male		<30 Years		Middle	
					Upper	
I will be vaccinated only if it is recommended by my doctor.	Female	0.364	>30 Years	0.372	Compulsory	0.152
	Male		<30 Years		Middle	
					Upper	
I agree with the view that it is better to be naturally infected by Covid-19 than to be vaccinated against it.	Female	0.070	>30 Years	0.003	Compulsory	0.001
	Male		<30 Years		Middle	
					Upper	
I agree with the view that Covid-19 vaccination should be administered only to vulnerable population groups. not to the general population.	Female	0.258	>30 Years	0.006	Compulsory	0.001
	Male		<30 Years		Middle	
					Upper	

Table 1: Association Between Demographic Characteristics and Acceptance and Attitudes Towards Covid-19 vaccine.

Discussion

The announcement and arrival of vaccines against Covid-19 disease sparked feelings of relief, excitement, and joy all over the world, since they represent an effective measure to contain the pandemic, defend public health, and vaccination is also an act of individual responsibility. It is a common belief that the universal participation of individuals in vaccination coverage contributes to the reduction of morbidity and mortality of the disease as well as to the faster lifting of restrictive measures.

Low vaccination acceptability rates are observed in this study. Specifically, 36.7% of respondents answered that they do not wish to get vaccinated, 41.6% showed great willingness and 21.7% average willingness. By carefully examining the literature, we notice that Covid-19 vaccination approval rates are 60-70%. A study by Khubchandani et al [10], reports that 79% of American citizens are willing to be vaccinated, while Reiter et al. estimate the vaccination acceptability rate to be 69% in their sample [11]. A similar study by Elise et al. estimates vaccination reluctance at 14% [13].

Comparing the results of this study with those by Khubchandani et al., Reiter et al. Elise et al. we observe low vaccination acceptance rates among our study population [10-13]. This difference is probably due to the lack of complete information on the benefits of vaccination, the fear of possible adverse effects and the negative attitude towards vaccinations in general.

The practice of population immunization has been accepted by most countries around the world. However, there is a portion of people who stand for and promote the opposite practice. Those who reject vaccines stand against scientific indications and research evidence and choose a biased stance against vaccination by selecting and promoting evidence that will serve their goal. Healthcare personnel should promote vaccinations, limit cases of refusal, educate people and their families on the benefits of vaccination and provide equal immunization opportunities for all. Actions like immunizing the whole population, even those in deserted or hard to reach areas and informing people through scientific lectures or via interactive approaches, without any social or financial discrimination, would contribute to the increase of Covid-19 vaccination approval rates and tackle the anti-vaccination movement [14, 15].

As in any pandemic situation, youth non-compliance with preventive measures signals the need to adopt new measures or to ease current measures and recovery time. Certain qualities of young people like good health, excitement, and sociability drive them to take a negative or "relaxed" stance towards the disease. In this study, a statistically significant difference was observed between people <30 years and those >30 years of age in relation to acceptability and general attitude towards vaccination. In

particular, young people in our study sample believe that it's better to get vaccinated later in the future in order to better estimate the effectiveness of the vaccine, that it is better to be naturally infected by Covid-19 than to get vaccinated against it and also that Covid-19 vaccination should only be administered to vulnerable groups, not to the general population.

The effectiveness of any vaccine is shown in the years to come. Increased effectiveness and lack of adverse reactions are important vaccination approval criteria. A study by Kreps et al. reports that increase in vaccine effectiveness from 50% to 70% and decrease of Covid-19 vaccine side effects from 1 in 10,000 to 1 in 1,000,000 would result in a rise in vaccination coverage [16].

People's education and health are interrelated concepts. When a person is not living in a healthy environment or has several health conditions, i.e. poverty, malnutrition, chronic diseases, then it is hard for them to get educated and on the other hand, the more someone gets educated, the more they take care of and defend their health [17-19].

Regarding means of protection and prevention of Covid-19 disease, we observe that the higher the education level is, the better the understanding and implementation of those measures is. A relevant study by Alobuia et al [20], reports that people who had a university degree title and high income, had more knowledge of the characteristics of the disease and the necessary prevention measures, while also keeping a more positive outlook on the future of the epidemic. Another study by Zhogn et al [21], mentions that good knowledge of disease prevention was associated with female sex, higher education level and high socioeconomic status.

From this study we deduct that the higher the education of the sample is, the more a positive attitude towards Covid-19 vaccination is observed, as well as less worry over side effects or development of serious health conditions. The same is concluded from a similar study by Schwarzingger et al. in which younger aged people showed reduced approval of vaccination [22].

Education is a fundamental social right of people and within the sphere of education, we include school and all social structures of non-typical learning. The development of knowledge, feelings, and values that the educational process provides, creates the perfect substrate for the development of prevention programs and effective planning of health policies by healthcare professionals.

Conclusions

In the present study, only a small degree of Covid-19 vaccination willingness is observed within the study population. People who wish to get vaccinated are women above 30 years of age, with higher education level. The main reasons behind vaccination reluctance are possible side effects and the fear of induction of serious health issues.

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Ethical Guidelines

The study was designed and conducted in accordance with the ethical principles established by University of Thessaly (No77 acceptance statement).

Conflict of Interests

The authors declare that there is no conflict of interest.

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