

Attitudes of the General Population Towards COVID-19 Vaccination in Relation to the Intention to Travel

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ABSTRACT

The impacts of the COVID-19 pandemic, as well as the measures to address it, have significantly affected various aspects of life and daily routines for everyone. One of the most important measures in combating the pandemic, the production of vaccines, has not only helped in containing COVID-19 but has also served as a launching pad for the development of new treatments and vaccines for other chronic diseases, such as cancer. The implementation of vaccination programs by governments worldwide has resulted in the reduction of restrictive measures taken by countries and increased the movement of citizens who feel greater security between countries. The aim of this study was to correlate vaccination with the intention to travel, in combination with the reasons for resistance put forth by citizens. The study is based on a quantitative cross-sectional analysis and was conducted among individuals with scheduled appointments at the Nea Filadelfeia Health Center, including healthcare workers and the general population. A total of 150 questionnaires were distributed in printed form at the health center, and 130 fully completed questionnaires were returned. In the general population, the questionnaires were distributed through an online form, and 132 responses were collected. Age, employment status, the level of concern about COVID-19 infection outside of work, and the opportunities offered by vaccination coverage for free travel were found to be independently related to vaccination status. Specifically, older age was associated with a higher likelihood of vaccination. Those who were employed were 4.26 times more likely to be vaccinated compared to those who were not employed. A greater fear of COVID-19 infection outside of work was associated with a higher likelihood of vaccination. A stronger influence of the possibility of free travel after vaccination was related to a higher likelihood of vaccination.

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1. Introduction

The COVID-19 pandemic was an unprecedented global health crisis that we faced and affected many aspects of our lives. Its severe impacts led to the implementation of measures that also significantly impacted everyone's daily routines. One of the most crucial measures in combating the pandemic was the production of vaccines. The rollout of vaccination programs by various governments worldwide may not have led to a dramatic decrease in the number of COVID-19 cases and deaths, but it did contribute to a reduction in restrictive measures. Additionally, citizens could travel with a greater sense of security between countries. The World Health Organization (WHO) emphasized the dual function of COVID-19 vaccination programs, viewing them not only as a significant public health intervention aimed at reducing mortality and morbidity but also as the much-desired incentive to reopen economies [1].

Globally, tourism stands as the third-largest industry, accounting for 10% of the GDP [2]. Therefore, the tourism sector encountered significant challenges during the COVID-19 pandemic. For EU citizens, a noteworthy development occurred on July 1, 2021, with the introduction of the European Digital COVID Certificate. According to the Commission's data, more than 2.3 billion certificates have been issued, and 51 countries have benefited from the use of the digital certificate [3]. This certificate served as a powerful tool in both limiting and subsequently lifting the restrictive measures implemented by

EU member states regarding travel, thereby promoting safe mobility [3].

Beyond the measures recommended by the World Health Organization and implemented by various countries, according to the research by Magano et al, the anxiety created by the socio-economic consequences of COVID-19 affected citizens' perceptions of travel [4]. In interviews with CNN, some individuals expressed that they do not wish to travel by plane without being vaccinated beforehand [5]. Therefore, despite the World Health Organization's announcement on May 4, 2023 [6], that the COVID-19 pandemic has stabilized, as deaths and hospitalizations have significantly decreased, and there are high levels of population immunity, this study remains highly relevant. This is because infections with new virus mutations and the vaccination of the population with updated vaccines continue to be of concern. According to statistical data on the Greek Ministry of Health's electronic platform, at the beginning of the study, it was expected that most participants would have been vaccinated. Additionally, a portion was expected to express resistance to vaccination. The purpose of this study was not only to confirm the reluctance of a portion of the population to get vaccinated but also to elucidate the reasons for vaccine resistance. In more detail, the following aspects were investigated: a) The correlation between vaccination and the participants' demographic characteristics and concerns, as well as their intention to travel (an exploration of whether there was

a correlation between age, educational level, and employment status and vaccination); b) Additionally, whether there was a correlation between the participants' prior experiences (whether they had previously contracted COVID-19) and their decision to get vaccinated; c) Finally, it was investigated whether the possibility offered by vaccination coverage influenced the participants' decision to get vaccinated. In this way, this study could be used by relevant authorities as a valuable tool for creating health education programs as well as targeted campaigns. It has the potential to address concerns and provide desired information to citizens, thereby motivating them to get vaccinated.

2. Methods

The research questions are investigated through a quantitative study conducted in three distinct groups: a) among insured individuals who visit the Nea Filadelfeia Health Center by appointment; b) among healthcare professionals employed in the facility (150 questionnaires were distributed in printed form, of which 130 were fully completed and returned); and c) in the general population (questionnaires were distributed via an online form, and 132 questionnaires were collected).

The study design was fully in compliance with the General Data Protection Regulation (GDPR). Initially, the necessary permissions were obtained for conducting the study from the 1st Health Region and the Ethics and Deontology Committee of the National and Kapodistrian University of Athens, Department of Nursing. Furthermore, the questionnaires were anonymous, accompanied by a consent form, and their processing was done collectively to ensure the participants' identities remained confidential. Finally, participants were given the opportunity to address any questions to the researcher.

The tool used as the basis for the research was the "Questionnaire on COVID-19 vaccination hesitancy" [7]. Special permission was initially obtained from the creators of the questionnaire. Subsequently, it was translated from English to Greek, and followed by a reverse translation. A pilot study with 30 questionnaires was conducted to ensure the validity and reliability of the questionnaire, during which two questions needed to be rephrased, and the final structure of the questionnaire was shaped. For the management and analysis of the data in this concurrent quantitative study, IBM SPSS 21.0 (Statistical Package for Social Sciences) was used as the statistical software tool. Data analysis was conducted using descriptive statistics, while bivariate analysis was performed using the corresponding parametric and non-parametric tests.

3. Results

The sample consisted of 262 individuals with an average age of 42.2 years (SD = 14.8 years). From the results, it appears that over two-thirds of the participants were women. Additionally, slightly less than half of the participants were tertiary education graduates, and about three-quarters of them were employed. The median number of family members was 3 (range: 2-4 members). Moreover, more than half of the participants had a close relative over the age of 70, but they did not live with them. Finally, slightly less than half of the participants had a family income of less than €1,500. It seems that a large majority of the sample did not have any diseases, with diabetes and obesity being the most common conditions in the sample (Table 1).

Table 1: Diseases reported by the participants

Do you suffer from any of the following diseases?		
	N	%
Cancer	3	1.1
Immunosuppressant	1	0.4
Obesity	19	7.3
Diabetes Mellitus	20	7.6
Cardiovascular Disease	8	3.1
Respiratory Disease	8	3.1
Rheumatologic Disease	11	4.2
None	211	80.5

Regarding the participants' behavior concerning vaccination and job loss due to COVID-19, the highest percentage of participants appeared to have not refused vaccination in the past, with a percentage of over 80%, while only 5% believed that the vaccine was unnecessary. Furthermore, over 90% of the participants stated that they did not lose their jobs due to the pandemic. Furthermore, the analysis showed that the participants who got sick were approximately equal to those who did not get sick (Figure 1). Nearly half of the participants were concerned that they might transmit the disease to friends and relatives, while a similar percentage, around 18%, were worried about catching the virus at or outside of work.

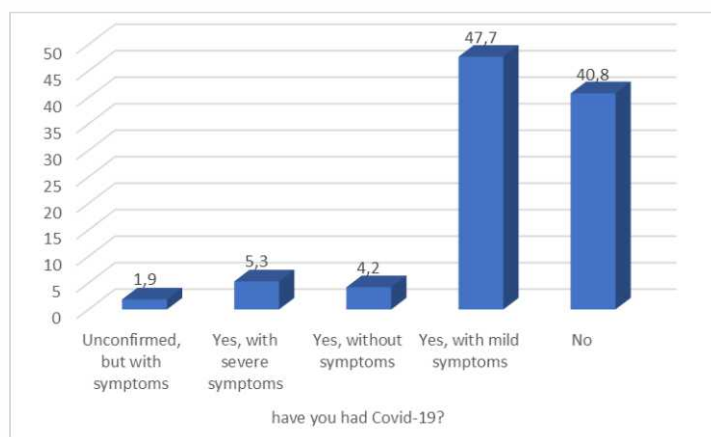


Figure 1: Percentage of participants who got sick from COVID-19

From the results, it appears that nearly 80% of the participants had already been vaccinated, with two-thirds of them having received three doses. Furthermore, 75% stated their intention to travel within the next six months, with over half of them wishing to travel within Greece. However, only 16% reported that the opportunities provided by vaccination coverage significantly influenced their decision to get vaccinated, and one in three individuals was concerned that travel might be restricted for the unvaccinated in the future.

The fact is that none of those who had not been vaccinated had the intention to get vaccinated within the next six months, with over half considering it very unlikely to get vaccinated and one in three considering it rather unlikely, while more than 10% did not wish to do so within the next six months (Table 2).

Table 2: Intention to get the Covid-19 vaccine by the unvaccinated participants

How likely is to get a Covid-19 Vaccine the next few months?	Very likely	0	0.0
	Somewhat Likely	0	0.0
	Not sure	5	7.8
	Somewhat Unlikely	17	26.6
	Very unlikely	35	54.7
	Not for the next 6 months	7	10.9

Regarding the knowledge they would like to have to get vaccinated, 40% stated that it would be important to know that the rapid production of the vaccine did not compromise its safety. Similar percentages mentioned that it is important to know that the organizations approving the vaccines follow strict regulations and that they prevent transmission with rates above 20%. For more than half of the participants, it is important to know that it cannot cause any immediate or long-term harm (Figure 2). The results of the analysis indicate that the vast majority, as a condition for getting vaccinated, consider whether they will be free to get vaccinated without consequences.

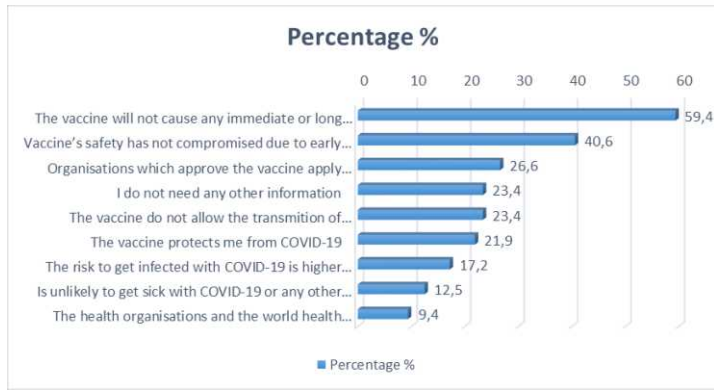


Figure 2: Information required by the unvaccinated participants in order to get the vaccination

As for the age of the participants, it differed significantly depending on whether they had been vaccinated or not. Those who had been vaccinated were significantly older than the unvaccinated. Additionally, vaccination rates varied significantly based on employment status, the number of family members, and the presence of any diseases. Specifically, those who were employed had higher vaccination rates than the unemployed; those who had a medical condition also had higher vaccination rates compared to those who didn't; and those who had been vaccinated had fewer family members compared to the unvaccinated.

Table 3: Vaccination in relation to travelling.

		Have you had the Covid-19 Vaccine already?				P
		No		Yes		
		N	%	N	%	
Do you intend to travel thenext six months?	No	15	23.1	50	76.9	0.867
	Yes	47	24.1	14.8	75.9	
To what extent did the opportunity provided by vaccination coverage to travel freely influence/impact to your decision to get vaccinated?		1.4 (0.9)	1 (1 -1)	2.7 (1.6)	2 (1 -4)	<0.001
Are you worried that in the future no vaccinated people will be banned to travel?	No	34	18.9	146	81.1	0.002
	Yes	30	36.6	52	63.4	

Subsequently, to find the factors related, regardless of the vaccination status of the participants, a multiple logistic regression was performed with the vaccination status as the dependent variable and the participants' demographic and clinical characteristics, their personal experiences and concerns, and their intention to travel as independent variables. The results of the analysis using the stepwise method are as follows: Age, employment status, the level of concern about getting infected with COVID-19 outside of work, and the possibility offered by vaccination coverage for unrestricted

Individuals who had never refused any vaccination recommended by a healthcare professional in the past had significantly higher vaccination rates, including for COVID-19, compared to those who had refused. Additionally, individuals who did not believe the COVID-19 vaccine would be effective had significantly lower vaccination rates.

Those who had been vaccinated had significantly lower illness rates compared to the unvaccinated. Moreover, the vaccinated group exhibited higher scores, indicating a greater concern about contracting COVID-19 within or outside of work and transmitting it to family and friends. Vaccination rates differed significantly among those who intended to travel, depending on their destination. Specifically, higher vaccination rates were observed among those who wanted to travel both within Greece and abroad compared to those who intended to travel to only one of these destinations (Figure 3).

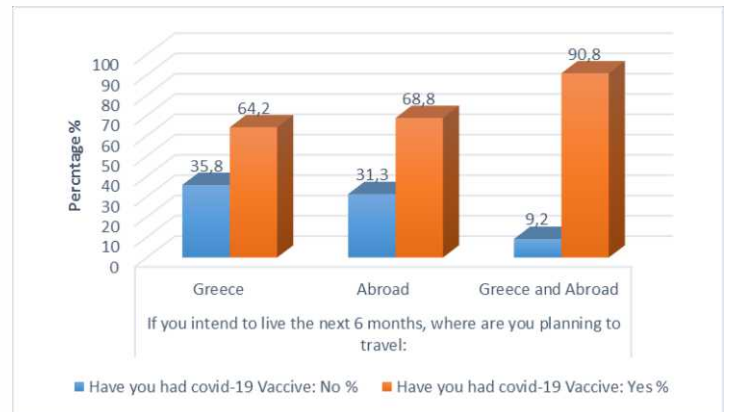


Figure 3: Vaccination in relation participants' preferable travel destination.

Moreover, the prospect of unrestricted travel offered by vaccination coverage did influence the decision to get vaccinated. However, it had a more significant impact on those who had been vaccinated compared to those who had not. Finally, those who had been vaccinated had less fear regarding the travel restrictions for the unvaccinated (Table 3).

travel were found to be independently related to vaccination status, as the level of statistical significance is less than 0.05. Specifically: a) Older age was associated with a higher likelihood of vaccination (p= 0.001); b) Those who were employed were 4.26 times more likely to be vaccinated compared to those who were not employed (p< 0.001); c) Greater fear of getting infected with COVID-19 outside of work was associated with a higher likelihood of vaccination (p= 0.001); d) Greater influence from the possibility of unrestricted travel after vaccination was associated with a higher likelihood of vaccination (p<0.001).

4. Discussion

This simultaneous quantitative research took place in the general population of Greece to investigate whether there is a correlation between the intention to get vaccinated and the intention to travel. Initially, an attempt was made to explore the correlation between the demographic characteristics of the participants and their decision to get vaccinated. After analyzing the results of the study, it was found that statistically, individuals who were not vaccinated differed in terms of age from those who were vaccinated; specifically, they were younger in age. However, gender and educational level do not seem to influence vaccination. In contrast, in a study conducted in Canada, opposite results were found, to get vaccinated varying depending on gender and educational level but not on age. About 86.6% of men wanted to get vaccinated, while approximately a quarter of participants with a lower university degree did not want to get vaccinated [8]. Furthermore, it should be emphasized that the number of family members affected the decision to get vaccinated, and the larger the family, the lower the likelihood of vaccination. In a similar study, it was revealed that in families with more than two children, the likelihood of vaccination decreased by 3% [9]. Family income and the presence of relatives over 70 years old did not seem to affect the vaccination decision, according to the results. However, in a study conducted in Hong Kong, it was found that approximately 46% of respondents lived in vulnerable age groups, but only 35% had been vaccinated. Moreover, a study conducted in the United States regarding family income showed that participants with lower family income seemed to have a lower acceptance of vaccination compared to those with higher income [10]. However, in the present study, family income did not appear to influence vaccination. Occupational status plays a significant role in the decision to get vaccinated, as evident from the analysis of the results, with employees, unemployed individuals, and retirees being vaccinated at high rates of 80%, 64%, and 83%, respectively. Employees at high risk of exposure to the virus, such as healthcare professionals, can justify the high vaccination rates among workers. In a post-analysis, 77% of healthcare professionals had been vaccinated [11].

It is a fact that healthcare professionals were among the first to be vaccinated with the commencement of vaccination programs, and many of them were motivated by the fear of work suspension, as vaccination for healthcare workers was mandatory. Further investigation into different ways to incentivize healthcare professionals for vaccination would be of interest. This could involve the development of continuous education programs for healthcare workers within the healthcare system, as there are still colleagues who have not been vaccinated. Another interesting piece of information from the analysis of the results that should be highlighted is that the presence of an underlying medical condition appears to negatively affect the decision to get vaccinated for COVID-19. Individuals without an underlying medical condition were vaccinated at a rate of 88%, while those with an underlying medical condition were vaccinated at a rate of 72%. Similar conclusions were drawn in a study that found individuals with one or more underlying diseases to have a 1.4 times lower likelihood of getting vaccinated compared to individuals without an underlying condition [12].

People with underlying medical conditions may be concerned about the potential effects of a new vaccine on their already compromised health, even though it would be expected for them to desire vaccination to protect themselves from severe illness.

Perhaps healthcare education programs within primary healthcare could address the resistance of vulnerable individuals to the virus by providing them with the necessary knowledge. Another point to consider is that previous vaccine refusal appeared to influence the decision to get vaccinated for COVID-19. Among those who received the COVID-19 vaccine, 80% had not previously refused vaccination, while more than half of the participants had previously declined some form of vaccination. This observation may reveal individuals' attitudes and behaviors towards vaccination in general, not necessarily limited to vaccination for COVID-19. Resistance to vaccination, in general, has become apparent in recent years among several parents who choose not to vaccinate their children. In one study, one of the reasons parents did not vaccinate their children was the belief that natural immunity is better than vaccines [13].

From the analysis of the results, it was found that the necessity of vaccination, information about the vaccine, vaccine safety, and concerns about its side effects do not affect the decision to get vaccinated. However, in a study conducted based on information gathered from social media in Germany, it appeared that a lack of information and the spread of misinformation about the COVID-19 virus and vaccination did influence the decision to get vaccinated [14]. On the other hand, vaccine effectiveness seemed to impact vaccination decisions. Those who believed the vaccine was effective were vaccinated at a rate slightly less than 80%, while about half of those who were not convinced of the vaccine's effectiveness got vaccinated. In a similar study conducted in Japan, 86% of the participants believed that vaccination is an effective and strong way to prevent the virus for themselves and those around them, with over 65% expressing a willingness to get vaccinated [15].

Additionally, according to the data extracted from the study, the illness of the participants from COVID-19 influenced their decision to get vaccinated. As a result, among those who had been ill, regardless of whether they had mild or severe symptoms, the likelihood of vaccination increased. These results can be explained by the realization of the participants that the pandemic affects all of us and that anyone can fall ill with the COVID-19 virus. It is of great interest that the overwhelming majority of the unvaccinated consider it unlikely to get vaccinated in the next six months, with the largest percentage, around 60%, citing the rapid production of vaccines as a deterrent factor that may compromise their safety. Additionally, over 70% believe that the organizations approving the vaccine have not enforced strict regulations. In a similar study, it was acknowledged that those whose mindset is far from vaccination programs are unlikely to get vaccinated [16]. Conducting similar studies may help identify factors contributing to vaccine hesitancy in the population against the coronavirus and better understand them, with the aim of creating actions to address them.

After analyzing the information collected in the study, it appears that the intention to travel does not affect the intention to get vaccinated. However, the destination of travel, specifically individuals traveling to Greece and abroad, is more likely to get vaccinated compared to those traveling only within Greece or only abroad. Those who wish to travel to both Greece and abroad likely feel that they are more exposed to the virus, as they may be undertaking more trips than those traveling solely within Greece or abroad. Strengthening the above claim, a study highlighted a strong correlation between the intention to get vaccinated and the desire to travel [17]. This can be directly related to additional information that is derived from the

analysis of the results, pointing out that the possibility offered by vaccination coverage to travel freely statistically affects the decision to vaccinate. The more people believe in this possibility, the greater the likelihood of getting vaccinated.

According to the results mentioned above, it would be beneficial for policymakers to develop campaigns aimed at positively influencing those who desire to travel frequently to get vaccinated against the coronavirus. Finally, not only should the action of travel medicine in Greece be reinforced, but its activities should also become widely known among the population. In this way, citizens will understand that COVID-19 vaccination is not the only measure aimed at facilitating international tourist movement, which might help reduce suspicion and resistance. Conducting further studies will contribute to this direction.

5. Conclusion

In conclusion, based on the results of the study conducted, the likelihood of vaccination increased in older age groups. Furthermore, those who were employed had a four-times higher likelihood of getting vaccinated compared to those who were not employed. Additionally, a greater possibility of unrestricted travel was associated with a higher likelihood of vaccination. Finally, the overwhelming majority of the unvaccinated individuals did not wish to get vaccinated in the next six months.

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