Original Article

Knowledge and Attitudes of Architecture and Nursing Students towards Vaccination against Covid-19

Anna Kardari, MSc, BSc, RN
School of Architecture, National and Technical University of Athens, Greece

Venetia-Sofia Velonaki, PhD, MSc, BSc
Assistant Professor, Faculty of Nursing, National and Kapodistrian University of Athens, Greece

Panayota Sourtzi, PhD, MSc, BSc
Professor, Faculty of Nursing, National and Kapodistrian University of Athens, Greece

Paraskevi Apostolara, PhD, MSc, BSc
Assistant Professor, Faculty of Nursing, University of West Attica, Athens, Greece

Petros Galanis PhD, MSc, BSc
Assistant Professor, Faculty of Nursing, National and Kapodistrian University of Athens, Greece

Athina Kalokairinou, PhD, MSc, BSc
Professor, Faculty of Nursing, National and Kapodistrian University of Athens Athens, Greece

Correspondence: Anna Kardari, MSc, BSc, RN, School of Architecture, National Technical University of Athens, 28is Oktovriou 42 35, Athens 106 82, Athens, Greece   E-mail: kardarianna@gmail.com

Abstract

Background: The COVID-19 pandemic has posed a serious challenge to the National Health Systems of all countries and a threat to public health worldwide. When the first approved vaccines were released, the disbelief of the general population as well as younger people, such as students, was apparent.

Aim: To assess the knowledge and attitudes of architecture and nursing students regarding vaccination against Sars-Cov-2.

Methodology: This was a quantitative cross-sectional study whose data was collected through a structured questionnaire distributed to 380 architecture and nursing students. The questionnaire consisted of 27 questions divided into three parts: demographic data, knowledge and attitudes about vaccination.

Results: The majority of the sample was female (77.1%), between 18 and 26 years old (97.4%) and of Greek nationality (95.3%). Fifty percent of the students studied architecture and the remaining 50% nursing. Architecture students were moderately or quite concerned about vaccines (p=0.004), believed that the vaccine can be administered during the illness or had no relevant knowledge (p<0.001) and would not have been vaccinated if there were no state rewards for the vaccinated and penalties for the unvaccinated (p< 0.001). In contrast, nursing students appeared to be less worried about vaccination (p=0.004), more knowledgeable about vaccines (p< 0.001) and less influenced by state rewards and penalties for whether to get vaccinated (p< 0.001). However, the rates of vaccinated students in the two universities were similar, so the university of attendance was not associated with the students' vaccination coverage (p=0.827).

Conclusions: Studying in fields of health sciences shapes the amount of knowledge and attitudes of students regarding health issues that concern them. The results of our study confirmed the need for additional vaccination education aimed at the enhancing knowledge and acceptance of the COVID-19 vaccine among non-healthcare students.

Keywords: students, vaccination, COVID-19 pandemic, vaccination hesitancy.

Introduction

Vaccines are the main means for the primary prevention of diseases and one of the most effective measures to ensure public health (World Health Organization). Immunization through vaccines is the best defense against serious and sometimes fatal communicable diseases that can be prevented (World Health Organization). Vaccination contributes to maintain the health of the population and to reduce the social and psychological impact of diseases, since individuals do not experience the disease or experience it with significantly

milder symptoms (European Commission, 2020). Therefore, hospitals are absolved from treating the seriously ill with the disease, thus the burden on health systems is reduced (Hamid, et al, 2020).

Despite the benefits of vaccination, there have always been people who resisted and did not believe in the effectiveness of this method of preventionion (World Health Organization). However, vaccines – and the possible side effects that accompany them – took a strong backseat in 2020 due to the COVID-19 pandemic, which was caused by the Sars-Cov-2 virus and was the first coronavirus pandemic (Liu, Kuo, Shih, 2020).

The COVID-19 pandemic has been, and continues to be, a serious challenge for National Health Systems of all countries and a threat to public health worldwide (World Health Organization). When after many efforts by the scientific community, the first approved vaccines were released; the disbelief of the population was evident (Allen, et al., 2022).

Vaccination hesitancy refers to the delay in accepting or refusing vaccines despite the availability of vaccination services, and is a complex issue that varies by time, place and vaccines (European Centre for Disease Prevention and Control), while in 2019 it was declared by the World Health Organisation (WHO) one of the top ten threats to health (World Health Organization). One of the reasons associated with vaccination reluctance is lack of knowledge about COVID-19 vaccines (Sallam, 2021).

Over the past two years, several studies have been conducted worldwide on the knowledge and attitudes of the population towards vaccines against COVID-19. These studies involve health professionals (Yassin, et al., 2021, Ciardi, et al., 2021, Holzmann-Littig, et al., 2021), health science students (Bălan, et al., 2021, Jiang, et al., 2021, Mishra, et al., 2023, Marques-Vieira, et al., 2023) or comparisons between health students/workers and other disciplines/professions (Sadaqat, et al., 2021, Kecojevic, et al,. 2021, Adenola, et al., 2021, Dara, et al., 2021, Chi, et al., 2021, Aklil, et al., 2022).

It seems that health sciences students have more knowledge and more positive attitudes towards vaccination as they are more willing to receive the Sars-Cov-2 vaccine compared to students from other universities (Bălan, et al., 2021, Jiang, et al., 2021, Kecojevic et al,. 2021, Chi,

et al., 2021, Adenola, et al., 2021, Dara, et al., 2021, Chi, et al., 2021, Aklil, et al., 2022, Mishra, et al., 2023, Marques-Vieira, et al., 2023).

In Greece, although vaccination hesitancy has been studied, we did not find any study on students' knowledge and attitudes towards COVID-19 vaccines. Thus, the purpose of this study was to investigate and compare the knowledge and attitudes of architecture and nursing students about vaccination against COVID-19.

Material and Method

This was a cross-sectional study carried out from June to July 2022, through printed questionnaires. The questionnaire was anonymous and was given to a total of 415 students from one nursing university department and one architecture department in Athens, during their examination period. The sample used in the study was a convenience one and the selection criterion of the participants was to attend one of the two aforementioned schools. Before completing the questionnaire, the students were informed about the purpose of the study, the protection of their personal data and the possibility not to participate if they did not wish to or to stop filling in if they did not feel comfortable. The study protocol was approved by the Ethics Committee of the Nursing Department of the National and Kapodistrian University of Athens and permissions were granted by the presidents of the two departments.

For the data collection the questionnaire of Al-Marshoudi, et al., (2021), was used and translated from English to Greek and vice versa, with the authors' permission. One additional question was added to fully meet the requirements of our study, which referred to students' motivation to get vaccinated.

The questionnaire consisted of 27 multiple choice and short answer questions, categorized into 3 parts. Part 1 was about the demographic data of the participants and included questions about their gender, age, ethnicity, religion, year of study, income, and medical history. Part 2 was about students' knowledge regarding Sars-Cov-2 vaccination, and included questions about the vaccines' effectiveness (Do you think the vaccine protects you from the disease? yes/no/I don't know), the conditions for their administration (Can the vaccine be given during a COVID-19 infection? yes/no, Can the vaccine be given if there is a history of infection with COVID 19? yes/no). Finally, the 3rd part was

about the students' attitudes towards vaccination and included questions about their concern about vaccines (Do you have any concerns about getting the vaccine? enough/moderate/none), their motives to get vaccinated (If there were no state penalties and rewards, would you get the COVID 19 vaccine? yes/no) and their vaccination coverage (Have you been vaccinated or are you planning to be vaccinated against the disease COVID 19? yes/no).

The questionnaire was initially given to 24 students (12 from Architecture and 12 from Nursing) as part of a pilot study. The IBM SPSS Statistics version 26 program was used for the statistical analysis of the completed questionnaires. All variables were categorical and their absolute (n) and relative (%) frequencies were calculated. The chi square independence test was used for univariate analysis of selected categorical variables, with a two-sided level of statistical significance of p=0.2. For the variables that were correlated in the previous test with the variable: school of study (architecture / nursing), a logistic regression was performed, with a two-sided level of statistical significance p=0.05, where the odds ratios, the corresponding 95% confidence intervals and the values were calculated p. To investigate the existence of a correlation between the independent variables of the logistic regression, the Tolerance and VIF indices were calculated.

Results

From the 415 students invited, 380 finally participated in the study (91.5% total response rate). Half of them were architecture students (190, 50%) and the rest were nursing students (190, 50%). The majority were women (293, 77.1%), between 18 and 26 years old (370, 97.4%) and of Greek nationality (362, 95.3%).

The chi square test revealed that architecture students had moderate concern about vaccines (p=0.004), believed that the vaccine protects them from the disease (p=0.01), believed that the vaccine cannot to be administered if there is a history of infection with COVID 19 (p<0.001), believed that the vaccine can be administered during the illness or had no relevant knowledge (p<0.001) and would not be vaccinated if there were no state rewards for the vaccinated and its penalties for the unvaccinated (p<0.001). In contrast, nursing students appeared to be less worried about vaccination (p=0.004), more knowledgeable about vaccines (p< 0.001) and less influenced by state rewards and penalties for whether to get vaccinated (p< 0.001). However, the percentages of vaccinated students in the two schools were similar (p=0.827) (Table 1). Logistic regression between school and independent variables, it was confirmed that state rewards and penalties played a key role in architecture students' decision to vaccinate (b=2.045, odds ratio=7.732, p<0.001). Furthermore, those who were concerned about vaccination were 0.25 times more likely to be architecture students than those who had no concern at all (b=-0.966, odds ratio= 0.381, p=0.004), while those who believed that the vaccine protects against disease were 3 times more likely to study nursing (b=-1.208, odds ratio= 0.299, p<0.001). The rest of the results are presented in detail in Table 2. The independent variables of the logistic regression were not correlated, as appears in the Table 3 from the indicators Tolerance and VIF.

Table 1: Chi square test

	Total n (%)	University of attendance		x^2	d.f*	p
		Architecture n (%)	Nursing n (%)			
Do you have any concerns about getting the vaccine?						
Enough	79(21)	45(24.1)	34(17.9)	11.134	2	0.004
Moderate	199(52.8)	107(57.2)	92(48.4)			
None	99(26.3)	35(18.7)	64(33.7)			

Do you think the vaccine protects you from the disease?						
No	171(45.4)	76(40.6)	95(50.0)	14.682	2	0.001
Yes	185(49.1)	107(57.2)	78(41.1)			
I don't know	21(5.6)	4(2.1)	17(8.9)			
Can you get sick from Sars-Cov-2 even after receiving the vaccine?						
No	4(1.1)	1(0.5)	3(1.6)	1.187	2	0.552
Yes	368(97.6)	183(97.9)	185(97.4)			
I don't know	5(1.3)	3(1.6)	4(1.1)			
Can the vaccine be given if there is a history of infection with COVID 19?						
No	61(16.2)	43(23)	18(9.5)	15.682	2	0.000
Yes	292(77.5)	129(69)	163(85.8)			
I don't know	24(6.4)	15(8)	9(4.7)			
Can the vaccine be given during a COVID-19 infection?						
No	257(68.4)	102(54.8)	155(81.6)	31.110	2	0.000
Yes	39(10.4)	27(14.5)	12(6.3)			
I don't know	80(21.3)	57(30.6)	23(12.1)			
Have you been vaccinated or are you planning to be vaccinated against the disease COVID 19?						
No	22(5.8)	10(5.3)	12(6.3)	0.161	1	0.688
Yes	355(94.2)	177(94.7)	178(93.7)			
If there weren't penalties and rewards from the state would you still get the COVID 19 vaccine;						
No	110(29.3)	77(41.4)	33(17.4)	26.222	1	0.000
Yes	266(70.7)	109(58.6)	157(82.6)			

*degrees of freedom

Table 2: Logistic regression

Independent variables	b	Adjusted odds ratio (95% confidence interval)	p
Do you think the vaccine protects you from the disease? (yes vs no)	-1.208	0.299 (0.171 - 0.523)	0.000
Can the vaccine be given if there is a history of infection with COVID 19? (yes vs no)	0.994	2.702 (1.348 - 5.414)	0.005
Can the vaccine be given during a COVID-19 infection? (yes vs no)	-1.239	0.290 (0.124 - 0.679)	0.004
Do you have any concerns about getting the vaccine?			
Enough vs Moderate	-1.362	0.256 (0.112 - 0.584)	0.001
Enough vs None	-0.966	0.381 (0.151 - 0.959)	0.040
If there were no state penalties and rewards, would you get the COVID 19 vaccine? (yes vs no)	2.045	7.732 (3.534 - 0.919)	0.000

Table 3: Binary regression

Independent variables	Tolerance	VIF*
Do you think the vaccine protects you from the disease?	0.900	1.111
Can the vaccine be given if there is a history of infection with COVID 19?	0.965	1.037
Can the vaccine be given during a COVID-19 infection?	0.848	1.179
Do you have any concerns about getting the vaccine?	0.730	1.369
If there were no state penalties and rewards, would you get the COVID 19 vaccine?	0.653	1.532

Discussion

Vaccination against COVID-19 has been and continues to be the subject of research in most countries of the world, since it is one of the most important public health issues in recent years. Many studies have attempted to explore the factors that influence an individual's decision to be vaccinated. Few studies have been conducted regarding university students' knowledge and attitudes toward COVID-19 vaccination (Kecojevic et al., 2021, Aklil, et al., 2021, Shahwan, et al., 2022, Sadaqat, et al., 2022, Mishra, et al., 2023, Marques-Vieira, et al., 2023).

The main finding of our study is that while the percentages of vaccinated students were similar and quite high in the two schools (94.7% in architecture and 93.7% in nursing), the intentions of the two populations to be vaccinated differed. More specifically, 82,6% of the nursing students stated that they would be vaccinated regardless of the state's rewards and penalties, in contrast to the architecture students where the corresponding percentage was 17,4% . The willingness of nursing students to be vaccinated has also been observed in other studies investigating their attitudes towards Sars-Cov-2 vaccination. In particular, according to Mishra et al., (2023), 79% of nursing students in India agreed to get vaccinated against Sars-Cov-2, while in Lisbon, 84.7% of the nursing students had already been vaccinated (Marques-Vieiraet al., 2023). In the study of Jiang et al., (2021), which also refers to nursing students, it appeared that among the 1488 nursing students interviewed, the scoring rate of vaccination willingness was 83.33%. In other studies that

compared the attitudes of students from different schools towards COVID-19 vaccine, it also appeared that the health science students were more willing to get vaccinated in relation to non health science students. More specifically, according to Sadaqat et al., (2021), medical students intended to get the COVID-19 vaccine, with only 1.37% expressing reluctance, compared to 2.55% of students from non-health science schools. The above findings are also confirmed by Balan et al., (2021), who found that the 88.5% of 1581 medical students in Romania were willing to be vaccinated, the 7.8% were undecided, and only 3.7% were vaccine resistant. With regard to health science students in general, compared to students from non health science. Aklil et al., (2022), found that health science students were 2.44 times more likely to have a positive attitude towards the COVID-19 vaccination compared to students of non health science faculties.

In the present study, it was observed that the nursing students, in addition to the intention to be vaccinated, also had a higher level of knowledge about the virus and vaccines. Respectively, Sadaqat et al., (2021), concluded that medical students showed a greater prior knowledge of vaccines as compared to non-medical students, further strengthening the presumption that they are better informed about the advancements in the health sector. These results are corresponding to Chi et al. (2021) study, which compared knowledge and acceptance of vaccination among healthcare workers and non-healthcare workers and found that perceived knowledge of COVID-19 vaccines was higher among healthcare workers than non-healthcare workers (p < 0.001). However, willingness to be vaccinated has been associated with having knowledge about it in studies involving the healthcare workers, such as the study by Holzmann-Littig et al., (2021) and Dara et al., (2021), which highlighted the correlation of vaccination hesitancy and non-acceptance with lack of knowledge about vaccination, lack of proper information about vaccines and feeling of lack of adequate information about vaccines.

Furthermore, in this study it was recorded that studying in areas of health sciences, even at the undergraduate level, shapes the amount of knowledge and the way students think about health issues that directly concern them. The results of our study highlighted and confirmed the need for additional vaccination education aimed at acceptance of the COVID-19 vaccine among non-healthcare students, as Kecojevic et al. (2021) concluded in their study on the extent of student vaccination coverage and their intention to be vaccinated against Sars-Cov-2 virus.

Finally, the results of the present study indicate that the university department is associated with the students' attitudes towards public health issues such as the COVID-19 vaccination. Despite the information from social networks, the mass media and the family environment, studying in a health-related field offers students, in addition to valid information and knowledge, the ability to distinguish accurate from inaccurate or even false information (Sadaqat et al., 2021).

Limitations of the study: The present study had some limitations as the questionnaires were given to the students during an examination period, so they may not have had the required concentration and calmness to answer the questions. In addition, the study sample included only architecture and nursing students in Athens, so it is not possible to generalize the results to the student population from the rest of the corresponding universities in Greece or elsewhere. Further study is needed in the student population in order to fully understand their attitudes and intentions towards vaccination.

Conclusions: Students were the adult age group with the highest unvaccinated rate compared to all other adult groups as they probably believed they are not vulnerable to COVID-19 (Aklil, Temesgan. 2022). Due to their familiarity with technology, they are informed by social networks, as a result of which they do not easily recognize true from false information, due to the volume of information and its lack of organization (Ngai, Singh, Yao, 2022). Health students are more aware of health issues, because despite the fact that their degree of exposure to social network information is the same as non health students, the former have the guidance of their professors and access to scientific health information sources, which are valid sources of information (Jabbour, et al., 2023).

It is considered appropriate to enhance the education of students on public health issues through the organization of informative seminars by health professionals specializing in public health and health promotion on vaccination, nutrition, and the prevention of communicable or hereditary diseases. In addition, it is proposed to create a section on the

website of each university, which will refer to public health issues such as mandatory and optional vaccination by age group, the required vaccines before traveling to certain foreign countries, the possible side effects of vaccines, the outbreaks of diseases such as influenza and ways of protection.

After analyzing the data, it appeared that students who do not belong to the health sector, such as architecture students, neither have fully understood the information about vaccines, nor have the right motives to be vaccinated. In this particular case, a high rate of vaccination was achieved due to the obligation and the benefits, whereas this high rate should be achieved through the increasing knowledge and modifying attitudes of the students. Therefore students, especially those from universities outside the health sector, need additional training and help from health professionals in understanding vaccination.

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