

## ORIGINAL ARTICLE

# Predictors of nurses' intention to accept COVID-19 vaccination: A cross-sectional study in five European countries

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**Abstract**

**Aims and Objectives:** To investigate nurses' intention in accepting COVID-19 vaccination and the factors affecting their decision.

**Background:** COVID-19 vaccination has started in most European countries with healthcare personnel being the first group receiving the vaccine shots. Their attitude towards vaccination is of paramount significance as their role in the frontline could help in the awareness of general population.

**Methods:** A study was conducted in Albania, Cyprus, Greece, Spain and Kosovo with the use of an online questionnaire. The Fear of COVID-19 Scale was used. The STROBE checklist was followed for this cross-sectional study.

**Results:** Study population consisted of 1135 nurses. Mean age of the participants was 38.3 years, while most of them were female gender (84.7%) and married (53.1%). Acceptance of a safe and effective COVID-19 vaccine was higher among Greek (79.2%) and Spanish (71.6%) nurses, followed by Cypriot (54%), Albanian (46.3%) and Kosovo (46.2%) nurses. Key factors for willingness to get vaccinated were male gender, living in a country with a high mortality rate in comparison with low mortality, being not infected with COVID-19, having high level of knowledge about COVID-19 vaccines and having been vaccinated for influenza in the last 2 years. Moreover, trusting the government and doctors regarding the information about the COVID-19 and having high level of fear about this virus were key factors for willingness to get vaccinated.

**Conclusion:** Vaccination of healthcare personnel is a crucial issue not only for their own safety but also for their patients'. Healthcare acceptance to get vaccinated can work as a role model for general population.

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**Relevance to clinical practice:** Gender, country, mortality rate, trust in government and health professionals and the level of fear were key factors that should be managed in clinical practice.

**KEYWORDS**

COVID-19, COVID-19 vaccine, nurses, pooled analysis, vaccine hesitancy

## 1 | INTRODUCTION

Since December 2019, the first cases of a novel disease were described due to a new coronavirus: the severe acute respiratory syndrome coronavirus 2 (SARS-CoV 2). On 30 January 2020, the World Health Organization (WHO) declared this situation as Public Health Emergency of International Concern and later on the 11th of March 2020 the world has been facing a pandemic (WHO, 2020). By April 2021, while the third wave of the pandemic has been threatening the world society, more than 145 million of confirmed cases have been described in 192 countries with approximately 3 million deaths globally (COVID-19 Map - Johns Hopkins Coronavirus Resource Center, 2021).

During the COVID-19 pandemic, WHO notified a roadmap suggesting global health policy strategies and highlighted that, for the Community Transmission epidemiologic setting, the vaccination of health personnel at high risk of SARS-CoV-2 infection must be a priority (Omer et al., 2020). Health professionals play a crucial role to the COVID-19 response, as by working under pressing conditions they put themselves, their patients and their households under high risk of transmission and infection (WHO, 2021). Centers for Disease Control and Prevention (CDC) suggests the early protection of healthcare workers as a critical step to preserve the capacity of the healthcare system, noting that as of 22 April 2021, approximately 473 thousand confirmed COVID-19 cases and 1559 deaths had been reported among U.S. healthcare personnel (CDC Covid Data & Tracker, 2021; Dooling et al., 2020). Furthermore, a recent survey from 37 nations, which focused on this ongoing tragedy, highlighted that the nation-by-nation number of HCW infections and deaths is not clear because of the lack of publicly available data and revealed that the median of the health professionals' deaths in 100,000 per population of the country was 0.05 (Erdem & Lucey, 2021).

Healthcare professionals' attitude towards vaccination against infectious diseases is of major importance. Health professionals, apart from their role in the frontline, participate also in promoting immunisation, informing the general public by addressing their concerns and their educational needs regarding vaccination (Herzog et al., 2013; Malik et al., 2020). Although health professionals seemed to be the most trusted source of vaccine-related information for the patients, there is evidence showing a vaccine hesitancy among healthcare providers. A large number of studies investigating the factors influencing vaccines' acceptance by health professionals show that the desire for self and others protection (i.e. family,

friends and patients), access to scientific literature, knowledge, trust in public health communications and belief about the vaccination safety and effectiveness influence their attitude (Galanis et al., 2020; Vasilevska et al., 2014; Zhang et al., 2011, 2012).

Current evidence also suggests moderate to low acceptance rates regarding healthcare workers' intention to vaccinate against COVID-19. Researchers also report some sociodemographic characteristics (i.e. male gender and older age) as well as positive attitude towards a COVID-19 vaccine, fear of COVID-19, comorbidity, perceived risk of infection and contact with confirmed cases as predictors to accept COVID-19 vaccination (Galanis et al., 2020). To some extent, profession seems to be strongly associated with healthcare workers' COVID-19 vaccination acceptance with physicians to be more willing to get vaccinated than nursing personnel (Gadoth et al., 2021; Gagneux-Brunon et al., 2021; Galanis et al., 2020; Grech, Bonnici et al., 2020; Kabamba Nzaji et al., 2020; Papagiannis et al., 2020). In light of this research evidence, we performed a pooled analysis of five European studies to investigate nurses' intention to accept COVID-19 vaccination and the factors affecting their decision.

## 2 | METHODS

### 2.1 | Design and participants

A multicentre cross-sectional study was conducted in five European countries (Greece, Albania, Cyprus, Spain and Kosovo) among professional nurses. The study was conducted during the second wave of the COVID-19 pandemic. Data were collected during January 2021 with the use of an online questionnaire which was administered to the individuals via email (sent by relevant nurses' associations and councils), newsletters and social networks. The study was conducted in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guideline (Supplementary Material 1).

### 2.2 | Procedure

Nurses were asked to participate in the study through a web questionnaire which included general information regarding the purpose and the process of the study. Before completing the questionnaire, the participants gave their written consent to participate in the

study. The questionnaire was anonymous and no personal data were recorded. Participation in the study was voluntary and individuals could withdraw at any moment.

The questionnaire comprised 29 items, requiring 6–8 min to complete it (Supplementary Material 2). The first part of the study questionnaire included questions regarding sociodemographic characteristics and beliefs. Researchers initially developed the questions in English language and, as a second step, each local research team translated and adapted them in their local language. No validation was performed for the first part of the questionnaire due to the nature of the questions and unstructured format. The second part of the instrument included the Fear of COVID-19 Scale (FCV-19S) which was developed to measure fear of coronavirus (Ahorsu et al., 2020). FCV-19S is a self-reported scale which comprises seven items rated on a 5-point Likert-type scale (1 = strongly disagree to 5 = strongly agree). A total individual score can be calculated ranging from 7 to 35 and higher score indicates greater fear. FCV-19S was translated and validated into Greek and Spanish and has been used in previous studies to measure fear of COVID-19 levels (Martínez-Lorca et al., 2020; Tsipropoulou et al., 2020). For the purposes of this multicentre study, the Albanian research team translated and validated the FCV-19S in the local language. The internal consistency for FCV-19S was excellent (Cronbach's alpha = .88).

### 2.3 | Statistical analysis

Continuous variables are presented as mean, standard deviation, median and interquartile range, while categorical variables are presented as numbers (percentages).

Demographic data, nurses' answers regarding the COVID-19 pandemic and vaccination and fear of COVID-19 were considered as the independent variables, while intention to accept a safe and effective COVID-19 vaccine was considered as the dependent variable.

We grouped the five countries in three categories according to the deaths per million population (mortality): low mortality (<400 deaths per million population), medium mortality (400–800 deaths per million population) and high mortality (>800 deaths per million population) ('COVID-19 Map - Johns Hopkins Coronavirus Resource Center', n.d.). High mortality group includes Spain, medium mortality group includes Greece, Kosovo and Albania, and low mortality group includes Cyprus.

First, we performed univariate logistic regression analysis and then we constructed a multivariable logistic regression model to eliminate confounding. Variables with  $p$ -values < .20 in univariate logistic regression were included in the multivariable model applying the backward stepwise model. In regression models, we defined the outcome as 1 if a nurse answered 'somewhat agree' or 'completely agree' to accept COVID-19 vaccination and 0 for any other response. We estimated adjusted odds ratios (OR) with 95% confidence intervals (CI) and  $p$ -values.

TABLE 1 Demographic characteristics of the nurses

Characteristics	N	%
Gender		
Male	173	15.3
Female	960	84.7
Age (years), mean and standard deviation	38.3	10.9
Country of origin		
Spain	482	42.5
Greece	259	22.8
Albania	216	19.0
Cyprus	113	10.0
Kosovo	65	5.7
Marital status		
Single	445	39.3
Married	601	53.1
Widowed	8	0.7
Divorced	77	6.8
Chronic disease		
Yes	240	21.1
No	895	78.9
Living with vulnerable groups during the COVID-19 pandemic		
Yes	384	33.9
No	750	66.1
Working in COVID-19 ward		
Yes	124	12.6
No	864	87.4
Clinical experience (years), mean and standard deviation	13.7	11.0

All tests of statistical significance were two-tailed, and  $p$ -values < .05 were considered significant. Statistical analysis was performed with the Statistical Package for Social Sciences software (IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp.).

### 3 | RESULTS

Demographic characteristics of the nurses are presented in Table 1. Study population consisted of 1135 nurses from Spain ( $n = 482$ ), Greece ( $n = 259$ ), Albania ( $n = 216$ ), Cyprus ( $n = 113$ ) and Kosovo ( $n = 65$ ). Mean age of the participants was 38.3 years, while most of them were females (84.7%) and married (53.1%). During the COVID-19 pandemic, 33.9% of the participants lived with vulnerable groups. Mean years of clinical experience was 13.7, while 12.6% of the nurses worked in COVID-19 ward.

Nurses' answers regarding the COVID-19 pandemic and vaccination are shown in Table 2. A great percentage of nurses (81.5%) have been in contact with a confirmed or a suspected case. One out of five nurses (19.2%) has been infected, and 67.7% has a family member/

TABLE 2 Nurses' answers regarding the COVID-19 and vaccination

	N	%
Contact with a confirmed or a suspected case of COVID-19		
Yes	924	81.5
No	210	18.5
Infected with COVID-19		
Yes	218	19.2
No	915	80.8
Family/friends infected with COVID-19		
Yes	766	67.7
No	366	32.3
Self-perceived likelihood of getting infected with the COVID-19 in future		
Very low	20	2.2
Low	110	12.0
Moderate	348	38.0
High	314	34.3
Very high	124	13.5
Self-perceived knowledge about the COVID-19		
Very low	2	0.2
Low	25	2.2
Moderate	369	32.6
High	552	48.8
Very high	184	16.3
Self-perceived knowledge about COVID-19 vaccines		
Very low	133	11.7
Low	367	32.4
Moderate	432	38.1
High	153	13.5
Very high	48	4.2
Influenza vaccination in 2019 and 2020		
Yes	411	36.2
No	724	63.8
Accept a safe and effective COVID-19 vaccine		
Completely disagree	55	4.8
Somewhat disagree	43	3.8
Neutral	296	26.1
Somewhat agree	334	29.4
Completely agree	407	35.9
Trust in government		
Yes	436	38.6
No	694	61.4
Trust in doctors regarding the information about the COVID-19		
Yes	836	74.0
No	294	26.0
Trust in government experts regarding the information about the COVID-19		

(Continues)

TABLE 2 (Continued)

	N	%
Yes	708	62.6
No	423	37.4
Reasons for refusal of a COVID-19 vaccine		
I have doubts about the safety, efficacy and effectiveness of the vaccine	541	47.7
I believe that even if I get infected with COVID-19, nothing bad will happen to me	43	3.8
I believe that the vaccine is not necessary	28	2.5
I do not believe in the necessity of vaccines	26	2.3
I believe that I will not be infected by COVID-19	22	1.9
I believe that the COVID-19 virus is not particularly dangerous	15	1.3

friend that has been infected. Almost half of the participants (47.8%) believed that the likelihood of getting infected with the COVID-19 in future was high to very high. Self-perceived knowledge about the COVID-19 was high to very high (65.1%), but low to very low about COVID-19 vaccines (44.1%). Almost one out of three nurses (36.2%) has been vaccinated for influenza in 2019 and 2020. 65.3% of the participants somewhat or completely agreed to accept a safe and effective COVID-19 vaccine, while only 8.6% disagreed (somewhat or completely) to accept this vaccine. Trust in doctors and in government experts regarding the information about the COVID-19 was 74% and 62.6%, respectively. These results were much higher than trust in government (38.6%). Doubts about the safety, efficacy and effectiveness of the COVID-19 vaccine (47.7%) were the most important reasons for refusal of this vaccine. With regard to fear of COVID-19 scale, mean score was 16.2 (standard deviation = 5.7), while the median score was 16 (interquartile range = 8).

Nurses from Greece gave the highest proportion of positive responses ('somewhat agree' and 'completely agree') regarding acceptance of a safe and effective COVID-19 vaccine (205 out of 259 nurses, 79.2%), followed by nurses from Spain (345 out of 482, 71.6%), Cyprus (61 out of 113, 54%), Albania (100 out of 216, 46.3%) and Kosovo (30 out of 65, 46.2%).

We conducted univariate and multivariate logistic regression analysis with nurses' intention to accept a safe and effective COVID-19 vaccine as the dependent variable (Table 3). Multivariable analysis identified that increased fear of COVID-19 (OR = 1.04, 95% CI = 1.01-1.06,  $p < .001$ ) and increased self-perceived

**TABLE 3** Univariate and multivariate logistic regression analysis with nurses' intention to accept a safe and effective COVID-19 vaccine as the dependent variable

Variable	Unadjusted OR (95% CI)	p-Value	Adjusted OR (95% CI) <sup>a</sup>	p-Value
Gender (males vs. females)	1.45 (1.02–2.08)	.04	1.74 (1.14–2.65)	.01
Age	1.03 (1.02–1.05)	<.001	NS	
Mortality group per million population				
Low	1.00 (reference)		1.00 (reference)	
Middle	1.39 (0.93–2.09)	.11	1.31 (0.78–2.20)	.30
High	2.15 (1.41–3.27)	<.001	2.92 (1.70–5.01)	<.001
Marital status (singles/widowed/divorced vs. married)	0.84 (0.66–1.07)	.16	NS	
Chronic disease (yes vs. no)	1.28 (0.94–1.74)	.11	NS	
Living with vulnerable groups during the COVID-19 pandemic (yes vs. no)	1.12 (0.86–1.45)	.41	NS	
Working in COVID-19 ward (yes vs. no)	0.87 (0.59–1.28)	.47	NS	
Clinical experience	1.03 (1.02–1.05)	<.001	NS	
Contact with a confirmed or a suspected case of COVID-19 (yes vs. no)	0.83 (0.60–1.14)	.26	NS	
Infected with COVID-19 (yes vs. no)	0.77 (0.57–1.04)	.09	0.68 (0.48–0.95)	.028
Family/friends infected with COVID-19 (yes vs. no)	0.92 (0.71–1.20)	.56	NS	
Self-perceived likelihood of getting infected with the COVID-19 in future			NS	
Very low	1.00 (reference)			
Low	1.32 (0.49–3.49)	.58		
Moderate	1.19 (0.47–2.98)	.71		
High	1.24 (0.49–3.11)	.65		
Very high	1.57 (0.59–4.15)	.37		
Self-perceived knowledge about the COVID-19			NS	
Low/very low <sup>b</sup>	1.00 (reference)			
Moderate	2.17 (0.98–4.81)	.06		
High	3.24 (1.47–7.13)	.003		
Very high	3.24 (1.42–7.42)	.005		
Self-perceived knowledge about COVID-19 vaccines				
Very low	1.00 (reference)		1.00 (reference)	
Low	2.30 (1.54–3.44)	<.001	2.01 (1.29–3.13)	.002
Moderate	2.93 (1.96–4.36)	<.001	2.55 (1.63–3.98)	<.001
High	9.43 (5.26–16.89)	<.001	8.32 (4.31–16.03)	<.001
Very high	3.44 (1.69–7.01)	<.001	3.50 (1.49–8.20)	.004
Influenza vaccination in 2019 and 2020 (yes vs. no)	2.69 (2.04–3.55)	<.001	2.08 (1.53–2.83)	<.001
Trust in government (yes vs. no)	2.62 (1.99–3.44)	<.001	2.03 (1.44–2.85)	<.001
Trust in doctors regarding the information about the COVID-19 (yes vs. no)	3.13 (2.38–4.12)	<.001	1.78 (1.27–2.47)	.001
Trust in government experts regarding the information about the COVID-19 (yes vs. no)	2.78 (2.16–3.59)	<.001	NS	
Fear of COVID-19 scale	1.04 (1.02–1.07)	<.001	1.04 (1.01–1.06)	<.001

Abbreviations: CI, confidence interval; NS, not selected by the backward elimination procedure in the multivariable logistic regression analysis with a significance level set at .05; OR, odds ratio.

<sup>a</sup>R<sup>2</sup> for the final multivariable model was 24.3%.

<sup>b</sup>We merged the categories 'very low' and 'low' due to low number of participants.

knowledge about COVID-19 vaccines (low vs. very low; OR = 2.01, 95% CI = 1.29–3.13,  $p = .002$ , moderate vs. very low; OR = 2.55, 95% CI = 1.63–3.98,  $p < .001$ , high vs. very low; OR = 8.32, 95% CI = 4.31–16.03,  $p < .001$ , very high vs. very low; OR = 3.50, 95% CI = 1.49–8.20,  $p < .001$ ) was related to increased intention to accept COVID-19 vaccination. Nurses that have not been infected with COVID-19 during the pandemic (OR = 1.47, 95% CI = 1.05–2.08,  $p = .028$ ) and those that have been vaccinated against influenza in 2019 and 2020 (OR = 2.08, 95% CI = 1.53–2.83,  $p < .001$ ) were more likely to take the COVID-19 vaccine. Also, trust in government (OR = 2.03, 95% CI = 1.44–2.85,  $p < .001$ ) and in doctors regarding the information about the COVID-19 (OR = 1.78, 95% CI = 1.27–2.47,  $p < .001$ ) increased the probability of getting COVID-19 vaccine. Nurses in countries with high mortality from COVID-19 (OR = 2.92, 95% CI = 1.70–5.01,  $p < .001$ ) and males (OR = 1.74, 95% CI = 1.14–2.65,  $p < .001$ ) were more willing to accept COVID-19 vaccination.

## 4 | DISCUSSION

This study aimed to assess nurses' intention to accept COVID-19 vaccination and the factors affecting their decision in five European countries (three European Union—Greece, Spain, Cyprus and two non-EU Albania and Kosovo). According to the results of the current study, 65.3% of the nurses were willing to get a safe and effective COVID-19 vaccine. Key reasons mentioned for not getting vaccinated were doubts about safety, efficacy and effectiveness of the vaccine, beliefs that nothing bad would happen even if they got infected etc. Vaccination of healthcare personnel is a crucial issue not only for their safety but also for patients. Healthcare acceptance to get vaccinated can work as a role model for general population.

Key factors for willingness to get vaccinated were male gender, living in a country with a high mortality rate (in comparison with low mortality), not being infected with COVID-19, having high level of knowledge about COVID-19 vaccines (in comparison with very low level), being vaccinated for influenza in the last 2 years, having trust in government and doctors and having high level of fears about COVID-19.

Vaccination process has started in several countries with healthcare personnel being the high priority group. Till now, due to the low number of available vaccine doses, vaccination coverage is low in Europe. Several media report that many healthcare personnel have rejected to get vaccinated, but no concrete data exist, and these reports should be read with caution. Different studies among healthcare personnel have reported different percentage of willingness to get vaccinated with a safe and effective vaccine (Akarsu et al., 2020; Gagneux-Brunon et al., 2021; Grech, Gauci, et al., 2020). These differences may be due to the incidence and mortality rates in the different countries. This is clear also in the current study with nurses living in countries with higher mortality rates being more willingness to get vaccinated in comparison with nurses living in countries with low rates. These results are also confirmed by a Chinese study which concluded that among healthcare personnel the chances of getting

vaccinated increase when the chances of getting infected are high (Fu et al., 2020). However, people already infected in the current study perhaps reported willingness not to get vaccinated due to the existence of the antibodies they have after infection. Additionally, another Chinese study in 1205 nurses revealed that only 63% of participants intended to take the COVID-19 vaccine (Kwok et al., 2021). Similarly, a study in USA reported low intention rates of nurses to get vaccinated with a free of charge COVID-19 vaccine (Shaw et al., 2021). Authors suggest that personal communication with staff is important to address this issue (Shaw et al., 2021).

The results of the current study revealing that women are less likely to get vaccinated in comparison with men are in line with the results of previous studies both in healthcare personnel and general population. A study in Australia reports that women are more ambivalent (1.89 times more likely) than men to get vaccinated (Alley et al., 2021). Similarly, studies among healthcare personnel in the USA and Malta report lower willingness for women to get vaccinated (Grech, Gauci, et al., 2020; Shaw et al., 2021). In general, vaccine hesitancy is considered as a big threat for global health (Geoghegan et al., 2020), while different factors and barriers have been reported to be responsible for this issue including female gender (Schmid et al., 2017). Probably another factor for men being more willing to get vaccinated is disease severity. Researchers state that men are more likely to be more seriously ill due to the disease or to die compared with women (Rozenberg et al., 2020). All these make of paramount significance to develop a specific strategy for women to increase vaccination rates.

It is worth noting that studies in European countries have confirmed low rates of influenza vaccine uptake among healthcare personnel (Petek & Kamnik-Jug, 2018; Toska et al., 2012; Wilson et al., 2019; Zhang et al., 2011). In the current study, healthcare personnel vaccinated for influenza in 2019 and 2020 had higher willingness to get vaccinated for COVID-19. Vaccination effectiveness, possible side effects and overestimation of health status have been reported as key reasons for not getting vaccinated for influenza (Pavlič et al., 2020; Wilson et al., 2019). Similar factors were reported by healthcare personnel in the current study who were not willing to get vaccinated. A systematic review concluded that making influenza vaccine mandatory for healthcare personnel is the most effective single intervention (Lytras et al., 2016). To our view, making vaccination for COVID-19 mandatory is not a panacea. Specific strategies with a primary focus on education are important to address the existing barriers. Additionally, an individual-based approach focusing on the personal reasons of hesitancy could be an effective intervention (Jarrett et al., 2015).

Healthcare personnel with high/very high level of knowledge about COVID-19 vaccines are more likely to get vaccinated in comparison with those with very low level. A study in Greece reported that healthcare personnel with high knowledge about SARS-CoV-2 were more likely to implement precautionary measures (Papagiannis et al., 2020). Furthermore, a Maltese study among general practitioners reported that lack of knowledge was a key factor for not getting vaccinated for COVID-19 (Grech, Bonnici et al., 2020,

Grech, Gauci, et al., 2020). In general, researchers indicate that lack of knowledge and risk perception are factors associated with the nurses' vaccination behaviours, while they state that increase of knowledge through vaccination campaigns in workplaces could raise vaccination uptake rates (Zhang et al., 2011, 2012).

Nurses who trust government and doctors regarding the information about the COVID-19 are more likely to get vaccinated in comparison with those who don't. With the onset of the pandemic, many conspiracy theories circulated in social media and Internet. The spread of these theories and rumours has a direct impact in misbelieving health institutions and authorities (Islam et al., 2020). Providing information regularly from reliable sources, promotion of official websites for receiving information and addressing of misperceptions are some of the measures government and health authorities should undertake (Mheidly & Fares, 2020).

Participants who reported higher rates of fear about COVID-19 were more willing to get vaccinated. Additionally, a French study revealed that fear about COVID-19 was a key factor for willingness to get vaccinated (Detoc et al., 2020). Another French study among healthcare workers reported similar results (Gagneux-Brunon et al., 2021), while several studies have reported high level of fear among frontline nurses (Hu et al., 2020; Labrague & Los Santos, 2020; Tayyib & Alsolami, 2020). Provision of regular mental health support could decrease fear level and improve their psychological status.

The current research has some limitations. Particularly, the cross-sectional nature of the study makes it difficult to draw conclusions about causality. Moreover, data collection did not take place across the whole countries but in specific cities of each country and this might have affected generalisability of our findings. Because study's population demographic characteristics are very close to that of the general European nursing population [84.7% female vs. 84% European region; median age 38 vs. 43.5 years European region], we estimate that the impact of this limitation will be modest and therefore generalisability of findings permitted (Boniol et al., 2019; Karp, 2018).

To some extent, this is among the first studies conducted in five European countries (three EU and two non-EU) that assesses the willingness of nurses to get vaccinated with a safe and effective COVID-19 vaccine. These results may be useful for policymakers and health authorities to address the factors and barriers reported by the participants. By addressing these factors, vaccination uptake rates could increase, and this will have a benefit not only for nurses but also for their patients.

## 5 | CONCLUSIONS

The current study assessed the intention of nurses in Greece, Cyprus, Spain, Albania and Kosovo to get vaccinated with a safe and effective COVID-19 vaccine. 65.3% of nurses were willing to get vaccinated for COVID-19, while the main barriers mentioned by those who did not want to get vaccinated were doubts about safety,

efficiency and effectiveness of the vaccines and overestimation of health status even in cases of an infection with SARS-CoV-2 etc. Being of male gender, living in a country with high mortality rate, not being infected with COVID-19, being vaccinated for influenza in 2019 and 2020, trusting the government and doctors and having high level of fears about COVID-19 were key factors for willingness to get vaccinated. It is important to focus on the aforementioned factors to increase vaccination rates. Additionally, communication of the safety, effectiveness and efficiency of the vaccines by health experts should be of high priority. A key target group should be women not vaccinated for influenza in the last years who seem to be more reluctant to accept a vaccine. Putting efforts to increase the knowledge about the disease could have a positive impact in higher vaccination uptake rates. Future research should focus on implementation of person-centred strategies to increase vaccination rates.

## DATA AVAILABILITY STATEMENT

Data available on request from the authors.

## CONFLICT OF INTEREST

None.

## AUTHORS' CONTRIBUTIONS

Conceptualisation of the idea, design and supervision of the study, performance of data collection and manuscript writing: EP and AP; design the study, performance of data collection and manuscript writing: AEM; design the study, performance of statistical analysis, results' section of the manuscript writing: PG; discussion of the results and contribution of data collection and the final manuscript: all other authors.

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## SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section.

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