Received: 7 July 2021 | Accepted: 16 April 2022

DOI: 10.1111/inr.12762

International Nursing Review WILEY

ORIGINAL ARTICLE

The attitudes of healthcare professionals in Turkey toward the coronavirus vaccine

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Abstract

Aim: To identify healthcare professionals' attitudes toward the coronavirus vaccine.

Background: Controlling the coronavirus pandemic depends on achieving a high level of herd immunity. Accordingly, it is very important that healthcare professionals become role models by displaying positive attitudes toward vaccination.

Methods: This cross-sectional study was conducted between March and April 2021 with a total of 309 healthcare professionals. Data were collected via an online surveys using an "Introductory Information Form" and "Attitudes Towards the COVID-19 Vaccine Scale." One-way variance analysis and Bonferroni correction were used for the comparison of nonnormally distributed quantitative variables between more than two groups. The Kruskal–Wallis test and Dunn–Bonferroni test were used to compare non-normally distributed quantitative variables between more than two groups. Pearson correlation analysis was performed to evaluate the relationships between the quantitative variables.

Results: Regarding the healthcare professionals' attitudes towards the COVID-19 vaccine, the average score of positive attitudes was 3.52 ± 0.87, and the average score of negative attitudes was 3.39 ± 0.68. A statistically significant weak relationship was found between the ages of the participants and the average score of their positive attitudes towards the COVID-19 vaccine. The negative attitude score of the individuals who wanted to get the coronavirus vaccine was significantly higher than those who were undecided or did not want to get the vaccine.

Conclusions: Healthcare professionals completely agreed with the opinion "I would persuade everyone around me to get the coronavirus vaccine," and completely disagreed with the opinion "I believe that they will inject microchips to people with the coronavirus vaccine." Healthcare professionals have positive attitudes toward the COVID-19 vaccine. COVID-19–vaccinated participants' positive and negative attitude scores were found higher than those who were not vaccinated.

Implications for nursing and health policy: Supportive social activities should be organized in the public sense so that healthcare professionals act as a role model by displaying positive attitudes toward vaccination.

KEYWORDS
attitudes , COVID-19, healthcare professionals, pandemic, vaccine

INTRODUCTION

Coronavirus disease 2019 (COVID-19) emerged in the world when the People's Republic of China reported cases detected in Wuhan, China, in November 2019, which had similar clinical symptoms to viral pulmonary infection (pneumonia) (Du Toit, 2020). All of the initial cases were reported to be epidemiologically connected to the seafood wholesale markets in Wuhan (Lu et al., 2020). The new coronavirus, which had similar characteristics to previous coronavirus outbreaks [severe acute respiratory syndrome (SARS) and Middle East respiratory syndrome] and posed a threat to world health, but with

an unknown etiology, was named as COVID-19 by the World Health Organization (WHO) on December 11, 2020 (Zhao et al., 2020).

According to the initial data, COVID-19 was more contagious and infectious, yet had lower mortality rates compared with other types of coronavirus (Liu et al., 2020). The WHO declared the COVID-19 outbreak as a pandemic when it spread over 160 countries, the number of cases reached 200,000, and the number of deaths reached 8000. In Turkey, the Ministry of Health announced the first case of COVID-19 on March 11, 2020, and the first virus-related death on March 15, 2020. With the virus spread in all cities in Turkey, Istanbul, Izmir, Ankara, Kocaeli, and Konya were declared as the cities with the most cases on April 1, 2020.

The most common symptoms of COVID-19 included cough, fever, tiredness, and headache, but symptoms such as hemoptysis, diarrhea, shortness of breath, and lymphocytopenia may also be seen. Severe cases tend to develop acute respiratory syndrome, acute myocardial infection, and other secondary infections.

The average time from the onset of the disease to death is 14 days, varying between 6 and 41 days. Mortality risk is higher for older people and those with weak immune systems (Wang et al., 2020). Protective measures to avoid getting infected include paying attention to personal hygiene and social distancing, wearing masks, and getting enough rest and fresh air (Guan et al., 2020).

Although there is no particular medication for the treatment of the coronavirus infection, it is stated that the COVID-19 pandemic can be ended only by vaccinating at least 60% of the population. Accordingly, some leading countries in the world, especially China, started to work on producing a vaccine. People started to get vaccinated while the trials for the vaccination continued. Even the best vaccines have no effect when they are not used. Recent studies showed that only 49% and 70% of the population of the United States were planning to get vaccinated when it was possible (Kwok et al., 2020; Palamenghi et al., 2020). This level of participation is probably below the limit needed for homogeneous herd immunity (Kwok et al., 2020), and it shows that the majority of the population would be vulnerable to the disease despite the vaccine.

The problem of refusing vaccination is caused by many factors worldwide (Sun et al., 2020). The WHO suggests a preventive strategy to overcome antivaccine thoughts/fears, to be prepared for the maximum effect when a vaccine is ready, and to build trust for the vaccine (Butler et al., 2015; French et al., 2020). It is stated that timing, efficacy, and location also have important impacts on the willingness for vaccination. It is stated that the design of the potential vaccines, testing these vaccines, and raising awareness of the public on the vaccine may help develop positive thoughts and attitudes on vaccination, and by doing so, the COVID-19 pandemic can be controlled. On the other hand, while obtaining different types of COVID-19 vaccines from different countries continues, the most worrisome matter is identifying the attitudes of healthcare professionals toward the COVID-19 vaccine who are expected to be important role models in controlling the pandemic.

Purpose and questions of the research

This study aimed to investigate healthcare professionals' attitudes towards the coronavirus vaccine and sought answers to the following questions:

- What are healthcare professionals' opinions on the coronavirus vaccine?
- What are healthcare professionals' attitude levels toward the coronavirus vaccine?
- Is there a significant relationship between the sociodemographic characteristics of healthcare professionals and their attitudes towards the coronavirus vaccine?

TOOLS AND METHODS

Research type

We used cross-sectional study study design

Population and sample of the research

The population of the research comprised all the healthcare professionals working at a private hospital in Istanbul ($N = 581$). We s aimed to include the entire population without performing a sample size calculation. The research was completed with a total of 309 healthcare professionals who voluntarily accepted to participate in the research and answered the online survey questions (53.1% of the population).

Data collection tools

Data were collected using an "Introductory Information Form" and the "Attitudes Toward the COVID-19 Vaccine Scale"

Introductory Information Form: The form includes a total of 18 sociodemographic questions (e.g., age, marital status, educational status, profession, years in the profession), information on COVID-19 infection and its vaccine (5 items), and opinions on the coronavirus vaccine (8 items), which were formed by the researchers in line with the literature (Geniş et al., 2020; Kabamba Nzaji et al., 2020; Ledda et al., 2021) and answered as "1, completely disagree; 2, disagree; 3, undecided; 4, agree; 5, completely agree."

Attitudes Toward the COVID-19 Vaccine Scale: The scale, developed by Genis et al. (2020), includes nine items and two dimensions (positive and negative attitude). The items in the scale are evaluated as "completely disagree (1)," "disagree (2)," "undecided (3)," "agree (4)," and "completely agree (5)." The

items in the negative attitude dimension are scored reversely. The total score obtained from each dimension is divided by the number of items in the dimension and a score between 1 and 5 is obtained. Higher scores obtained from the positive attitude dimension indicate that the attitude toward the vaccine is positive. Items in the negative dimension are calculated after reversing, and higher scores from this dimension indicate that the negative attitude toward the vaccine is less. Reverse items are coded as 1→5, 2→4, 3→3, 4→2, and 5→1. Cronbach's Alpha coefficient of the scale is 0.80. In this study, the internal consistency coefficient of the scale for positive attitude was calculated as 0.920, which indicated that it was valid and reliable at a very good level. The internal consistency coefficient for negative attitude was calculated as 0.757, which indicated that it was valid and reliable at a good level.

Data collection process

The research was conducted between March and April 2021. Data collection tools were transformed into "Google Surveys" and sent to participants online as WhatsApp messages or via MMS. Participants were asked to click the Google Surveys link in the message and complete the forms. A survey link was sent to the participants twice a week throughout the research to remind them to complete the forms.

Data analysis

The Number Cruncher Statistical System (NCSS) program was used for statistical analyses. Statistical methods (average, standard deviation, median, frequency, percentage, minimum, and maximum) were used for evaluating the research data. The Shapiro–Wilk test and graphical analyses were used to test if the quantitative variables were normally distributed. One-way analysis of variance and Bonferroni correction were used for the comparison of normally distributed quantitative variables between more than two groups. The Kruskal–Wallis test and Dunn–Bonferroni test were used for the comparison of nonnormally distributed quantitative variables between more than two groups. Pearson correlation analysis was used to evaluate the relationships between quantitative variables. Statistical significance level was accepted as $p < 0.05$.

Ethical considerations

Students' voluntariness and willingness to participate in the study were respected. Written consent of the participants who volunteered to participate in the research was obtained by asking them to click the "I agree to complete online survey" statement in the message that was sent to their mobile phones. Written consent was obtained from the Turkish Ministry of Health Scientific Research Committee (2021-02-21T16_06_18) and the Medipol University Ethical Board (04/03/2021, Ethics Approval Number: 258).

RESULTS

The results of the research were analyzed in four parts.

Healthcare professionals' characteristics

In the research, the average age of the participants was 28.48 ± 9.09 (min. = 18, max. = 69), the majority were single (67%, $n = 207$), 32% ($n = 99$) graduated from other schools, 37.2% were working as nurses, and the others were working as technical personnel (23.3%), allied health personnel (17.8%), medical records personnel (14.2%), and physicians (7.4%), respectively. The average years in the profession of the participants was 6.82 ± 7.76 (min. = 0.2, max. = 37) years. One hundred eighty-one (58.6%) of the healthcare professionals and 174 (56.3%) of their relatives had not had COVID-19. Two hundred thirty-one (74.8%) of the healthcare professionals were vaccinated against the coronavirus, and 207 (67%) were not afraid of the coronavirus vaccine.

Healthcare professionals' opinions on the coronavirus vaccine

When the healthcare professionals' opinions on the coronavirus vaccine were examined, 53.7% ($n = 166$) of participants answered as "undecided" to the statement, "I believe the coronavirus vaccine is completely protective against COVID-19 infection." Almost 40% of the participants (39.8%, $n = 123$) answered as "agree" to the statement, "I would persuade everyone around me to get the coronavirus vaccine." One hundred thirty-five (43.7%) participants answered as "undecided" to the statement, "I believe that the coronavirus vaccine is commercially produced by developed countries." One hundred twenty-nine (41.7%) participants answered as "undecided" to the statement, "I do not believe in the protection of the coronavirus vaccine." One hundred eighty-five (59.9%) participants answered as "completely disagree" to the statement "I believe that they will inject microchips to people with the coronavirus vaccine." One hundred fifty-four (49.8%) participants answered as "completely disagree" to the statement, "I believe that the coronavirus vaccine will be the end of humanity." One hundred sixteen (37.5%) participants answered as "disagree" to the statement, "I think the coronavirus vaccine is completely fabricated." One hundred thirty-five (43.7%) participants answered as "disagree" to the statement, "I believe that the coronavirus vaccine will have serious adverse effects" (Table 1).

Healthcare professionals' attitudes toward the coronavirus vaccine

The average score of the healthcare professionals' positive attitudes toward the coronavirus vaccine was 3.52 ± 0.87

TABLE 1 Distribution of participants' opinions on the coronavirus vaccine

	Completely disagree	Disagree	Undecided	Agree	Completely agree	Mean ± SD
I believe the coronavirus vaccine is definitely protective against COVID-19 infection	22	28	166	79	14	3.11 ± 0.89
I would persuade everyone around me to get the coronavirus vaccine	17	43	97	123	29	3.34 ± 1.01
I believe that the coronavirus vaccine is commercially produced by developed countries	11	93	135	53	17	2.91 ± 0.91
I do not believe in the protection of the coronavirus vaccine	31	97	129	37	15	2.70 ± 0.97
I believe that they will inject microchips to people with the coronavirus vaccine	185	94	23	6	1	1.52 ± 0.74
I believe that the coronavirus vaccine will be the end of humanity	154	118	26	7	4	1.67 ± 0.83
I think the coronavirus vaccine is a complete fabrication	106	116	64	14	9	2.04 ± 0.99
I believe that the coronavirus vaccine will have serious adverse effects	35	135	97	34	8	2.50 ± 0.93

(min. = 1, max. = 5), and the average score of negative attitudes was 3.39 ± 0.68 (min. = 1.4, max. = 5).

Evaluation of healthcare professionals' attitudes toward the coronavirus vaccine according to their characteristics

When the relationship between the healthcare professionals' sociodemographic characteristics and their attitudes towards the coronavirus vaccine were examined, a statistically significant positive weak relationship was found between the average age of the healthcare professionals and the positive attitude score for the COVID-19 vaccine ($r = 0.213$; $p = 0.001$; $p < 0.01$), and a statistically significant positive weak relationship was also found between their average age and negative attitude scores ($r = 0.211$; $p = 0.001$; $p < 0.01$). Time in the profession had a statistically significant positive weak relationship with positive attitudes scores ($r = 0.211$; $p = 0.001$; $p < 0.01$) and negative attitudes scores ($r = 0.212$; $p = 0.001$; $p < 0.01$) (Table 2).

The evaluation of the participants' attitudes toward the COVID-19 vaccine according to their COVID-19–related characteristics is presented in detail in Table 3. The positive attitude scores of the participants who did not know whether they had had COVID-19 were found to be significantly lower than those who had had or did not have COVID-19 ($p = 0.036$, $p = 0.003$, and $p < 0.05$).

Vaccinated participants' positive and negative attitude scores towards the coronavirus vaccine were found to be statistically significantly higher than those who were not vaccinated ($p = 0.001$ and $p < 0.01$, respectively) (Table 3).

The positive and negative attitude scores of the participants who wanted to be vaccinated against coronavirus were found to be significantly higher than those who did not want to be vaccinated and were undecided ($p < 0.01$). The positive and negative attitude scores of the participants who did not want to be vaccinated against coronavirus were found to be significantly lower than those who were undecided about getting vaccinated ($p < 0.05$) (Table 3).

The positive and negative attitude scores of the participants who were not afraid of the coronavirus vaccine were found to be significantly higher than those who were afraid of the vaccine and were undecided ($p < 0.01$) (Table 3).

DISCUSSION

As in other countries in the world, vaccination for COVID-19 started on January 14, 2021, to control the pandemic, following the Ministry of Health's emergency use authorization for CoronaVac. However, not knowing the protectiveness of the vaccine caused some bias and hesitation for vaccination at all levels of society. In a study conducted with healthcare students and professionals in Malta to evaluate the attitudes and hesitations toward the COVID-19 vaccine, it was detected that family doctor trainees and nurses had the highest hesitation for the COVID-19 vaccine (Cuschieri & Grech, 2021).

In this study we investigated the attitudes of the healthcare professionals in Turkey toward the COVID-19 vaccine, the majority of the healthcare professionals and their families had not had COVID-19. Around three quarters (74.8%) of the participants were vaccinated for COVID-19, and 67% were not afraid of getting vaccinated. The results of the research are discussed under three headings:

Although the majority of the participants stated that they would convince everyone around them to get vaccinated, they gave a low response to the statement, "I believe that they will inject microchips to people with the Coronavirus vaccine." Some 43.7% of the participants stated that they were undecided about convincing everyone around them to get the coronavirus vaccine. Nearly one third (31.4%) of the participants disagreed with the opinion that the coronavirus vaccine would not be protective, 43.7% were undecided on believing the

TABLE 2 Evaluation of the positive and negative attitude scores toward COVID-19 vaccine in terms of demographic characteristics

		Positive attitude score		Negative attitude score	
		r	*p*	*r*	*p*
Age (year)		0.213	*0.001***	0.211	*0.001***
Time of work		0.211	*0.001***	0.212	*0.001***
		Mean	SD	Mean	SD
Marital status	Single	3.40	0.84	3.32	0.70
	Married	3.78	0.88	3.56	0.61
	[a] *p*	*0.001***		*0.003***	
Educational status	[1]High school degree	3.29	0.82	3.15	0.62
	[2]Undergraduate degree	3.61	0.89	3.51	0.70
	[3]Graduate degree	4.15	0.70	3.77	0.72
	[4]Other	3.50	0.85	3.43	0.63
	[b] *p*	*0.001***		*0.001***	
	[c] *Post hoc test*	*3 > 1.2.4*		*1 < 2.3.4*	
Profession	[1]Doctor	4.07	0.70	3.70	0.70
	[2]Nurse	3.16	0.89	3.17	0.68
	[3]Technical personnel	3.71	0.71	3.53	0.55
	[4]Allied health personnel	3.82	0.80	3.56	0.71
	[5]Medical record personnel	3.51	0.86	3.40	0.67
	[b] *p*	*0.001***		*0.001***	
	[c] *Post hoc test*	*2 < 1.3.4*		*2 < 1.3.4*	

r = Pearson correlation coefficient.
[a]Student *t* test.
[b]One-way ANOVA and post hoc.
[c]Bonferroni test.
***p* < 0.01.

idea that the coronavirus vaccine was produced by developed countries for commercial purposes, and 49.8% completely disagreed with the idea that the coronavirus vaccine would be the end of humanity. Moreover, 43.7% of the participants disagreed with the idea that the coronavirus vaccine would have serious adverse effects.

In another study performed in Italy to investigate healthcare professionals' attitudes towards vaccines both before and during COVID-19, 93 healthcare professionals accepted vaccination for COVID-19, but a part of them ($n = 194$) rejected the vaccine; 57% ($n = 446$) of the healthcare professionals stated that the coronavirus vaccine should not be mandatory for healthcare professionals (Ledda et al., 2021). In the same study, 65% of the healthcare professionals ($n = 512$) stated that they would recommend the coronavirus vaccine for patients at high risk. It was found that 78% of the healthcare professionals who rejected the vaccine ($n = 1529$) were against it because they were worried about the safety of the vaccine (Ledda et al., 2021).

Healthcare professionals took very important responsibilities by being at the forefront of the fight against the COVID-19 pandemic. Nonetheless, the need to achieve a high level of herd immunity is inevitable to control the pandemic. Although studies for a vaccine against COVID-19 infection, the cause and treatment of which are not known exactly, have been expedited in many countries, it is a known fact that the reliability for these vaccines is not at a sufficient level. Therefore, healthcare professionals are the largest group that can be a guide and role model in achieving herd immunity. However, even healthcare professionals can display different attitudes toward the COVID-19 vaccine.

In our study, health professionals generally had a positive attitude towards the coronavirus vaccine. In another study performed with 467 people from different occupations in Turkey, it was found that the majority of the participants (44.1%) believed in the positive effects of the vaccine and wanted to get vaccinated (Nazli et al., 2021). In another similar study, it was stated that 75% of healthcare professionals wanted to get vaccinated against COVID-19 (Ledda et al., 2021). There are a few studies that investigated the attitudes towards the coronavirus vaccine. In a study by KabambaNzaji et al. (2020) with healthcare professionals in Congo, it was found that only 27.7% of the participants accepted to get vaccinated for COVID-19. The results of an online survey in France showed that 81.5% of the participants accepted vaccination for COVID-19 (Detoc et al., 2020). France, like Italy, has faced a

TABLE 3 Evaluation of participants' attitudes toward the coronavirus vaccine according to their COVID-19-related characteristics

		Positive attitude score		Negative attitude score	
		Mean	SD	Mean	SD
Status of having had COVID-19 (median)	Yes	3.40 (3.5)	0.90	3.34 (3.4)	0.69
	[2]No	3.65 (3.8)	0.82	3.45 (3.4)	0.68
	[3]I don't know	2.73 (2.5)	0.71	3.04 (3.0)	0.41
	[a]*p*	*0.001***		*0.045**	
	[d] *Post Hoc test*	*3 < 1.2*		*3 < 2*	
Status of having COVID-19 in the family (median)	Yes	3.46 (3.8)	0.87	3.37 (3.4)	0.68
	No	3.56 (3.8)	0.86	3.40 (3.4)	0.69
	I don't know	3.75 (3.5)	1.04	3.57 (3.3)	0.66
	[a]*p*	*0.717*		*0.938*	
Status of getting the coronavirus vaccine	Yes	3.77	0.74	3.54	0.65
	No	2.79	0.80	2.95	0.57
	[b] *p*	*0.001***		*0.001***	
Willingness to get the coronavirus vaccine	[1]Yes	3.99	0.60	3.67	0.56
	[2]No	2.30	0.61	2.59	0.62
	[3]Indecisive	2.94	0.44	3.10	0.47
	[c] *p*	*0.001***		*0.001***	
	[c] *Post hoc test*	*1 > 2.3/2 < 3*		*1 > 2.3/2 < 3*	
Being afraid of the coronavirus vaccine	[1]Yes	2.95	0.76	2.95	0.63
	[2]No	3.77	0.85	3.54	0.69
	[3]Indecisive	3.08	0.57	3.23	0.43
	[c] *p*	*0.001***		*0.001***	
	[c] *Post hoc test*	*2 > 1.3*		*2 > 1.3*	

[a]Student t-test.
[b]Kruskal–Wallis test and *post hoc* Dunn test.
[c]Student *t* test.
[d]One-way ANOVA and *post hoc*.
[e]Bonferroni test.
*$p < 0.05$.
**$p < 0.01$.

huge wave of COVID-19 with serious rates of morbidity, hospitalization, and mortality. It is stated that the wave of COVID-19 risk and mortality rates in the countries are strategic for deciding on vaccination (Ledda et al., 2021).

In our study, statistically significant relationships were found between the sociodemographic characteristics (age, sex, marital status, educational level, and occupation) of the healthcare professionals and the scores of their attitudes toward the coronavirus vaccine. As the age of healthcare professionals increases, their positive and negative attitudes toward vaccines also increase. In another study, intention to get vaccinated was higher for young healthcare professionals and those aged under 30 and above 51 years; the main reason why they accepted to get vaccinated was to protect themselves and their patients (Ledda et al., 2021).

In another study, contrary to our study results, although there was a statistically significant difference between healthcare professionals who were male and those who had comorbidities (Ledda et al., 2021), it was emphasized that this difference was probably caused by the awareness that people with comorbidities were at higher risk for severe COVID-19 infection (Vella et al., 2020). In other studies, males were more likely to get vaccinated against COVID-19 compared with females (Dror et al., 2020; Kabamba Nzaji et al., 2020). These results could be related to the differences in the perception of the risk of the disease between the sexes.

In our study, nurses had a more negative attitude toward the coronavirus vaccine than other healthcare professionals. Similar to our study, in Maraqa et al. (2021), nurses were most hesitant about getting vaccinated and physicians were the most supportive of vaccination. In Ledda et al. (2021), it was revealed that 81% of the physicians and 70% of the nurses and midwives accepted vaccination against COVID-19. In another study, 40% of nurses in Hong Kong were willing to get vaccinated (Wang et al., 2020). On the other hand, in other studies conducted in Congo and Israel, physicians were more likely

to get vaccinated against COVID-19 compared with other healthcare professionals (Dror et al., 2020; Kabamba Nzaji et al., 2020). Differences in the attitudes towards the COVID-19 vaccine and the willingness to get vaccinated may be caused by differences in cultural groups and educational levels. On the other hand, it can be said that the unit in which the healthcare professionals work, encountering patient groups with a high risk of COVID-19, and providing care for these patients may also affect these results. Further studies should be conducted to investigate the attitudes of healthcare professionals who provide care for patients with high risk and who work in units with a high risk of infection (e.g., emergency unit and intensive care unit) toward the COVID-19 vaccine.

In our study, participants who were vaccinated against COVID-19 had higher positive and negative attitude scores compared with those who were not vaccinated. Contrary to our study, Ledda et al. (2021) stated that less than half of the healthcare professionals who got vaccinated for COVID-19 believed that vaccination for COVID-19 should be mandatory. The field of work of the healthcare professionals was not questioned in our study. However, we assumed that healthcare professionals who worked in COVID-19 clinics had more intention to get vaccinated because they could see the severity of the disease and high mortality rates.

On the other hand, concern about the efficacy of the vaccine and the lack of information on the SARS-CoV-2 may affect the positive or negative attitudes toward the coronavirus vaccine. Moreover, the thoughts of healthcare professionals on the vaccine could be related to the perception of being at risk of infection (Ledda et al., 2021).

Healthcare professionals play a key role in increasing the level of herd immunity against epidemic diseases. Accordingly, it is very important to develop positive attitudes toward vaccination in healthcare professionals who make a ceaseless effort in the fight against infectious diseases such as COVID-19.

Limitations

The most important limitations of the study are the collection of data via online questionnaires, not using any sampling method in determining the sample size because it was desired to reach the entire population, and the response rate of the questionnaires was 53.1%.

In addition, conducting the research in a single center and not questioning the working units of the health professionals included are other limitations of the study.

Implications for nursing and health policy

Healthcare professionals play a critical role in building trust between the public and the vaccination program and are often cited as the most reliable source of information on vaccination (WHO, 2021). For this reason, healthcare professionals should be confident about vaccination and be able to relay this trust to their patients, families, friends, and other members of the community. Just like the general public, healthcare workers are at risk of receiving misinformation, which raises concerns about vaccine safety. Hence, before the introduction of the newly produced coronavirus vaccines, benefits, adverse effects, risks, and possible complications should be explained to healthcare professionals in a transparent manner. Messages should be shared with healthcare professionals to reinforce factual information and advice. Concerns among healthcare professionals must be acknowledged and respected.

The Ministry of Health should take action to understand the attitudes and intentions of healthcare professionals regarding routine vaccination and coronavirus vaccination. Various studies should be conducted using mixed methods to understand barriers to vaccination, drivers, and decision-making mechanisms to understand healthcare professionals' thoughts, perceptions, and attitudes about vaccination. Changes in the perceptions, attitudes, and thoughts of healthcare professionals about vaccination should be closely monitored.

The successful adoption of the coronavirus vaccine by the public can be achieved with the exemplary behavior of healthcare workers, who are respected by society. A positive social norm should be created by emphasizing those who have been vaccinated, not those who have not been vaccinated, in institutions and visual media. Engage health workers to promote vaccination among colleagues. Middle managers should promote vaccination and advocate for staff support. Healthcare professionals should be included in decision-making processes. Alliances should be formed with health worker organizations and bodies.

Healthcare professionals should become role models by displaying positive attitudes toward the coronavirus vaccine to control the pandemic. Thus, social responsibility projects should be conducted for healthcare professionals to develop positive attitudes toward vaccination. For this, informative conversations about coronavirus vaccines and short films or commercials should be made by healthcare professionals, especially on the most-watched television channels and the most followed social media accounts in the country, in cooperation with the Ministry of Health.

On the other hand, large numbers of healthcare workers are needed to support the coronavirus vaccination efforts across the country, and for this, various rotations are performed in shifts to those working in vaccination units in hospitals. Health workers are appointed to increase the speed of vaccination in various areas open to the public (e.g., shopping malls, public education centers, and convention centers). Therefore, health workers should be motivated, supported, and approved. To provide motivating workplace conditions and recognition of healthcare workers by management (WHO, 2021), (1) the mental health and well-being of healthcare professionals should be ensured, (2) additional wages, incentives, and rewards should be given to healthcare professionals, (3) the roles and responsibilities of healthcare professionals should be clarified, and (4) in the event of a vaccine safety crisis, healthcare professionals should be provided with clear regulatory provisions and legal support.

In addition, to improve the knowledge, skills, and confidence of healthcare professionals, personalized global education programs should be implemented regularly, taking into account sociocultural characteristics, and the proper storage, handling, preparation, and administration of coronavirus vaccines.

CONCLUSION

In the research, although healthcare professionals mostly agreed with the view of persuading everyone around them to get the coronavirus vaccine, they were less inclined to believe that people with the coronavirus vaccine would be injected with a microchip. It was found that the healthcare professionals in Turkey had high-level positive attitudes and low-level negative attitudes toward the COVID-19 vaccine, and factors such as age, marital status, educational status, and occupation affected their attitudes. To control the COVID-19 pandemic, initiatives should be taken to ensure that healthcare professionals develop a positive attitude toward vaccination.

The "do-no-harm principle" is a fundamental ethical responsibility for care providers. Therefore, it is inevitable for healthcare professionals to be vaccinated against preventable diseases such as COVID-19. In addition, the roles of healthcare professionals should include supporting immunization by participating in vaccination programs, counseling patients, addressing patients' concerns and questions, and fighting myths.

ACKNOWLEDGMENT

The authors sincerely thank healthcare professionals.

AUTHOR CONTRIBUTIONS

Study design: FA, BT, NTT; data collection: FA, NTT; data analysis: FA, BT, NTT; study supervision: BT; manuscript writing: FA, BT, NTT; critical revisions for important intellectual content: BT, FA.

CONFLICT OF INTEREST

No conflict of interest has been declared by the authors.

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How to cite this article: Azizoğlu F., Terzi B. & Topçu Tarakçi N. (2022) The Attitudes of the Healthcare Professionals in Turkey Towards the Coronavirus Vaccine. *International Nursing Review*, 69, 566–574. https://doi.org/10.1111/inr.12762