

# Views of Turkish healthcare professionals and their hesitations about the COVID-19 vaccine

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#### Ethics Committee Approval

This study was approved by the Health Sciences University Adana City Training and Research Hospital Clinical Research Ethics Committee on December 16, 2020 (1168). In addition, an application was made to the Ministry of Health Scientific Research Platform, which was also approved (consent number 2020-12-09T18\_02\_36).

All procedures in this study involving human participants were performed in accordance with the 1964 Helsinki Declaration and its later amendments.

#### Conflict of Interest

No conflict of interest was declared by the authors.

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## Abstract

**Background/Aim:** Views of health sector workers on the safety and efficacy of a vaccine, which forms the basis of a vaccination program, can affect both the public perception of the vaccine and its implementation in the community. Accordingly, this study aimed to acknowledge potential hesitations of healthcare specialists and their views on the acceptability of a vaccine before initiating a vaccine policy program.

**Methods:** A total of 442 healthcare professionals participated in this study by answering a 24-question survey online from their social media accounts. We analyzed the data and present the descriptive statistics with mean and standard deviation values. We performed *t*-test analysis and analysis of variance to examine physicians' attitudes toward vaccines and the coronavirus disease 2019 (COVID-19) infection, based on their demographic, and other characteristics. Tamhane and Sidak paired comparison tests were conducted to determine differences in groups after variance analysis.

**Results:** Of the healthcare professionals, 55.9% agreed that the COVID-19 vaccine would end the pandemic. A total of 72.6% of healthcare workers reported that they were planning to get vaccinated with the free COVID-19 vaccine, which is to be distributed by the Ministry. The biggest drawback of the vaccination was its unknown long-term side effects. We noted a difference in the attitude toward vaccines in those older than 41 years and younger than 30 years of age. We also found a significant and positive relationship between the attitudes of the participants toward the measures taken regarding the COVID-19 infection and their attitudes toward the vaccine.

**Conclusion:** Hesitation about a vaccine during a pandemic is a major obstacle to implementing vaccination campaigns. To continue the benefits of vaccination programs, understanding and addressing these hesitations held by healthcare professionals are crucial to the successful implementation of a vaccination program.

**Keywords:** COVID-19 vaccines, Healthcare workers, Vaccine hesitation

## Introduction

The new coronavirus disease 2019 (COVID-19) is a viral infection first identified on January 13, 2020, because of research conducted on a group of patients who developed respiratory symptoms in Wuhan Province, China, in late December. The first case was reported in Turkey on March 11, 2020 [1]. Since then, more than 80 million patients with COVID-19 have been affected worldwide by this pandemic. In Turkey, more than 2 million patients have been diagnosed with COVID-19, and about 20,000 have lost their lives [2].

The first aim of health services and health personnel is to ensure that people continue to lead healthy lives. Vaccination is the most effective method of providing protection from infectious diseases. Although technical infrastructure and healthcare workers are the most important criteria in vaccination studies, it has become important that healthcare providers have sufficient knowledge about vaccines and are informed about the necessity of vaccination through in-service training provided by the Ministry of Health [3].

The COVID-19 pandemic has generated a heavy burden on healthcare worldwide and has no specific antiviral therapy. As immunization is one of the most successful and cost-effective health interventions for preventing infectious diseases, vaccines against COVID-19 are considered of paramount importance in the prevention and control of COVID-19 [4]. The immunity of the community depends on achieving a total vaccination rate ranging from 80% to 95% of community members. With these vaccination rates, we can ensure that we protect not only the vaccinated individuals of the society but also the unvaccinated individuals, as well. Therefore, vaccines administered to an individual are related to the health status of all members of society [5]. Although remarkable progress has been made in this area, significant challenges remain regarding future vaccination against COVID-19, one of which is the uncertainty about the public acceptance of COVID-19 vaccination. Vaccine acceptance reflects the general perception of disease risk, vaccine attitudes, and demand in the general population and it is critical to the success of immunization programs to achieve high vaccination coverage rates for emerging infectious diseases [4].

Hesitation about a vaccine constitutes a threat to public health [6]. Although vaccination has reduced the global burden of disease and death, public confidence in vaccines might be affected by various concerns. Therefore, vaccine hesitation can lead to delays in implementing or even the rejection of vaccines, which can sometimes contribute to outbreaks. Maintaining confidence in vaccination depends on the interaction between patients and healthcare professionals. The need for and acceptance of vaccination by healthcare professionals is an important factor associated with public adoption, compliance with vaccination schedules, and reduced vaccine hesitancy. Moreover, vaccinated healthcare professionals also have a significant influence on patients' decision to vaccinate [7].

Health professionals' intention to use the vaccine and recommend it to their patients depends on their knowledge and attitude about it. Healthcare workers with a negative attitude toward vaccines, reluctance, or hesitation have been reported to convey their hostile attitude toward the vaccine to patients and are

less likely to recommend receiving the vaccine. Moreover, vaccine hesitation observed in the general population has been associated with the level of vaccine hesitation among health professionals. In addition, the quality of educational information on vaccines by healthcare professionals has been useful in improving patients' acceptance of the vaccine, reducing reluctance, and guiding informed decisions about vaccination [7].

The media are promoting the vaccines that will be applied to control the COVID-19 pandemic. We see that there is speculation about the side effects and different production technologies of the COVID-19 vaccines, whose phase 3 studies have just been completed.

This results in insufficient community-based trust. The aim of our study was to understand the hesitations regarding the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) vaccine, which will be administered first to healthcare workers and patients deemed to be at risk in Turkey and determine methods to eliminate these reservations. Therefore, we conducted a survey among healthcare professionals to determine whether they have any hesitation regarding the vaccination program and their views on administering the SARS-CoV-2 vaccine.

## Materials and methods

This study was approved by the Health Sciences University Adana City Training and Research Hospital Clinical Research Ethics Committee on December 16, 2020 (1168). In addition, an application was made to the Ministry of Health Scientific Research Platform, which was also approved (consent number 2020-12-09T18\_02\_36).

Between October 16, 2020 and December 29, 2020, we identified academic physicians (professors, associate professors), specialist physicians, family physicians, midwives, nurses, health technicians, health officers, and pharmacists working in public and private institution hospitals in various provinces. We planned to include healthcare workers between the ages of 20–72 years who agreed to participate voluntarily in the study. The participants received a link to the questionnaire through their e-mails, social media accounts, and social media groups in the institutions where they worked in the provinces and districts. The questionnaires were answered online. Except for healthcare professionals, we included no community members in the research group.

No personal identification information was requested from the participants. Before using SurveyMonkey services, you must have a SurveyMonkey account. The Survey Creator can only enter this account with a password. We do not share information or data with third parties outside of SurveyMonkey. All response data at the individual level is controlled by the Survey Creator. The responsibility belongs only to the physician responsible for conducting the survey and the study. The organization SurveyMonkey provided the confidentiality principles for the preparation and use of the survey (SurveyMonkey, © 1999–2020). Before completing the questionnaire, SurveyMonkey tested the usability, and technical functionality of the electronic questionnaire. After participants completed the questionnaire, we analyzed the results of all the answers and exported them into an Excel file format. SurveyMonkey participates in and has approved compliance with the European Union–United States Privacy Shield Framework and the Swiss–United States Privacy Shield.

The full data set and complete answers to the questionnaire are available at <https://tr.surveymonkey.com/results/SM-WMPYRYHZ7/>. We did not provide any nonmonetary incentives, monetary rewards, or offers to submit survey results.

Our survey consisted of six pages and twenty-four questions, and the average response time was 5 minutes, 55 seconds. The average number of questions per page was four, and the average number of options per question was six. The software program used for the survey restricted participants from moving to other questions without first answering the previous question. Participants did not skip any of the questions in our questionnaire; all questions were answered. As we were looking for significant data, we preferred closed-ended questions. Closed-ended questions are designed to create measurable data, and the precision of the questions can be determined. The simple coding of these types of questions made it easy to prove the statistical significance of the survey results. In addition, the message learned through closed-ended questions allowed the respondents to be arranged based on the preferences they chose. We detected a survey achievement rate of 100%, because of its short and understandable structure. The questionnaire was administered in the Turkish language for it be understood by all healthcare professionals and to be answered within a brief time. Demographic variables included age, gender, marital status, with who shared their household, position in the health sector, working hours, department in which the respondent worked, the institution in which the respondent worked, respondent's province, and the environment in which the respondent was in contact with COVID-19. Questions on opinions regarding the sufficiency of the SARS-CoV-2 infection prevention practices and perspectives on the SARS-CoV-2 vaccine were in the last nine questions of the survey.

Research on all healthcare workers employed in both public and private hospitals in Turkey was made by the Turkey Health Statistics Yearbook 2018 Newsletter. The number of healthcare workers (N = 642,184) was determined based on the data of the Ministry of Health. Using a simple random sampling method, we calculated that at least n= 384 healthcare workers with a 5% acceptable error margin and a 95% confidence level could provide the representation power of the universe.

We obtained data from 442 healthcare workers in this study. We found that this sample size would provide a sampling power of 0.92 and an effect size level of 0.40, which enabled sufficient power and a sufficient effect size level, respectively. The inclusion of 442 healthcare workers in this study constitutes a sufficient sample size to obtain meaningful results.

**Statistical analysis**

For the data analyses, we present the descriptive statistics with means and standard deviations. We performed *t*-test analysis and analysis of variance tests to examine the physicians' attitudes toward vaccines and the COVID-19 infection, based on their demographic, and other characteristics. To determine differences among groups after variance analysis, we conducted Tamhane and Sidak paired comparison tests. *P* values of less than 0.05 were considered statistically significant. We used SPSS 20.0 to analyze the results. The research population-sample size, power level, and effect size calculations were determined using G \* Power Version 3.1.7.

**Results**

We presented the statistical results of the questions we asked in our research questionnaire from Table 1 to Table 12. Each table has its own explanation.

Table 1: General characteristics of healthcare professionals

Characteristic	n	%	
Age, years	20–30	44	10.0%
	31–40	106	24.0%
	41–50	168	38.0%
	51–60	100	22.6%
	≥61	24	5.4%
Gender	Male	148	33.5%
	Female	294	66.5%
Marital status	Married	343	77.6%
	Single	99	22.4%
Position in the healthcare industry	General practitioner–family physician	63	14.3%
	Assistant doctor	17	3.8%
	Specialist doctor	154	34.8%
	Associate professor	20	4.5%
	Professor doctor	29	6.6%
	Midwife–nurse	122	27.6%
Institution	Other healthcare professionals	37	8.4%
	University hospital	35	7.9%
	Education and research hospital	134	30.3%
	Public hospital	64	14.5%
	Private health institutions	67	15.2%
	Family health center	142	32.1%

Table 2: Unit worked during the pandemic period

Unit Worked during the Pandemic Period*	n	%
Policlinic	248	56.1%
Operating room	158	35.7%
Inpatient service	135	30.5%
COVID-19 inpatient service	82	18.6%
Delivery room	115	26.0%
Emergency service	74	16.7%
Pandemic area emergency service	51	11.5%
Laboratory	14	3.2%

\*Respondents may work in more than one unit.

Table 3: Level of contact with patients with COVID-19

Contact Level	n	%
I have direct contact with patients diagnosed with COVID-19	172	38.9%
I have been in contact with symptomatic patients diagnosed with possible COVID-19	159	36.0%
I am in contact with patients who do not show symptoms of COVID-19	213	48.2%
I am in contact with all patients with or without COVID-19 symptoms	302	68.3%
I am in contact with patients who have recovered from COVID-19 infection	242	54.8%
The healthcare worker I worked with, with whom I was in contact, was diagnosed with COVID-19	261	59.0%
I had COVID-19 infection, recovered, and continue to work	65	14.7%

Table 4: Other characteristics of healthcare professionals

	n	%	
Weekly working hours	20–30	32	7.2%
	31–40	37	8.4%
	41–50	266	60.2%
	≥51	107	24.2%
Who do you live with?	Alone	47	10.6%
	Nuclear family	328	74.2%
	Extended family	67	15.2%
Have you changed where you live or stay because of COVID-19 infection and being in contact with patients?	No	347	78.5%
	Yes	95	21.5%
Do you think that society is aware of COVID-19 and complies with the decisions taken?	Yes	8	1.8%
	No	352	79.6%
	Partially	82	18.6%
When do you expect the pandemic process to return to normal?	6 months	29	6.6%
	7–12 months	119	26.9%
	1–2 months	219	49.5%
	>2–3 years	13	2.9%
	I do not know	62	14.0%

Table 5: Preferred vaccine if vaccinated

Vaccine Preference	n	%
Oxford-Astra Zeneca (England)	30	6.8%
Moderna (USA)	15	3.4%
Pfizer-BioNTech (USA+Germany)	201	45.5%
Gamaleya (Sputnik 5) (Russia)	3	0.7%
Sinovac (China)	105	23.8%
Koçak Farma (Turkey)	60	13.6%

Table 6: Concerns about vaccination

Concerns about Vaccination	n	%
The biggest drawback in vaccine administration is that I have no information about the long-term side effects	355	80.3%
I am worried that the side effects of vaccines will affect me; I am afraid it will affect my workforce and social life	126	28.5%
I think the supervisory bodies that approve vaccines are biased and do not trust these organizations	86	19.5%
Which country's vaccine is more reliable, I have no idea	77	17.4%
There is a lot of speculation in the media about whether to do it	50	11.3%
I think that the aluminum content in preparing vaccines causes precancerous formations, and I have no idea how safe this dose is	47	10.6%
It has a claim to play with our DNA	28	6.3%
I have no idea about the vaccine and its feasibility	21	4.8%
I think it is the sheath theory of implanting traceable microchips in the bodies of millions of people with the "vaccine microchip" claimed in the media	14	3.2%
I think it is unnecessary to administer the vaccine because of the high recovery rate and high antibody rates without vaccination	13	2.9%
The claim that vaccines contain some tissues of human and animal embryos	6	1.4%
I heard that some vaccine ingredients contain pig gelatin	5	1.1%
I have heard that some vaccines have been developed in chicken egg and chick embryos; I do not think it is animal friendly	2	0.5%

Table 7: Vaccine opinions and preferred vaccine

If you decide to have a paid vaccine instead of the SARS-CoV-2 vaccine of the Sinovac company, which will be distributed free by the Ministry, which company would you prefer?	n	%
Absolutely will not get vaccinated	44	10.0%
The price does not matter; I am hesitant about the vaccine	89	20.1%
Moderna (USA)	16	3.6%
Pfizer-BioNTech (USA + Germany)	203	45.9%
Oxford-Astra Zeneca (England)	35	7.9%
Gamaleya (Sputnik 5) (Russia)	3	0.7%
Sinovac (CoronaVac) (China)	44	10.0%
Domestic vaccine	8	1.8%

Table 8: Attitudes toward the COVID-19 infection and vaccine

	Mean (SD)**
Do you agree with the idea that with the onset of the COVID-19 process, hands are washed more than usual?	4.13 (1.03)
Do you agree with the idea that the use of masks and disinfectants with COVID-19 prevents the spread of the virus?	4.41 (0.71)
Do you agree with the idea that the COVID-19 vaccine will end the pandemic?	3.61 (1.00)
When the COVID-19 vaccine is given to healthcare workers free by the Ministry of Health, would you consider having the vaccine at your institution?	4.04 (1.06)
If the vaccine administration is controlled by the HES* code individually, do you agree with the idea that unvaccinated people in the society will not stay if it becomes compulsory to be shown during travel, in shopping malls, entertainment venues, banks, and government institutions?	3.66 (1.13)

\*HES is a code that allows a person to share with organizations and individuals whether they carry any risk in terms of the COVID-19 disease in their operations, such as transportation or visiting within controlled social life. The HES codes shared can be queried through the application or through the services provided to the institutions. \*\*Mean: Average Score, SD: Standard Deviation

Participants stated that during the COVID-19 outbreak, as healthcare workers, they washed their hands more than before and their level of compliance with the measures taken was high. However, we determined that the participants' confidence towards vaccination were above average. Moreover, the increase of vaccination confidence with various practices were not high (3.6 of 5). We also observed that the healthcare personnel were not highly confident in the vaccines, and according to the perceptions of health personnel, nor was the public.

### Factors Affecting Attitude Levels

Table 9 shows the difference in the attitudes of the participants toward the measures taken against COVID-19 based on the participants' ages. We found less trusting attitudes among individuals aged between 20 and 30 years ( $P=0.03$ ). However, we found a difference in the attitudes of the participants towards the vaccine according to their ages, which was attributed to a

difference in the attitude of individuals older than 41 years ( $P=0.01$ ).

We also observed that the attitudes of participants toward measures taken against the COVID-19 infection did not differ based on gender ( $P=0.93$ ). However, more trusting vaccination attitudes of male individuals ( $P=0.04$ ) resulted in a difference based on gender. Attitudes of the participants toward the measures taken regarding the COVID-19 infection did not differ based on their marital status ( $P=0.93$ ), while attitudes toward the vaccine did. Married individuals had more positive attitudes ( $P=0.04$ ).

The attitude of the participants toward the measures taken regarding the COVID-19 infection differed with their positions in the health sector, and the difference was because of the less positive attitude of the resident physicians ( $P=0.01$ ). The differences in the attitudes of the participants toward the vaccine were found to result from their positions in the health sector. Resident physicians, nurses, and other healthcare personnel had more negative attitudes, while associate professors and professors were more positive regarding the subject ( $P=0.01$ ).

We found no difference in the attitudes of the participants toward the measures taken regarding the COVID-19 infection based on their institutions ( $P=0.13$ ). However, we observed that the attitudes differed according to the participants' institutions, which was attributed to higher vaccine confidence of healthcare professionals working at universities ( $P=0.01$ ).

Table 9: Participants' attitudes toward the COVID-19 infection and vaccine according to their characteristics

Specifications	Attitude toward measures taken regarding COVID-19 (Mask, disinfection) Mean (SD)**	P-value	Attitude toward the COVID-19 Vaccine (Propensity to Trust and Adopt)	P-value
			Mean (SD)**	
Age, years	20-30	0.03*	3.42 (0.84)	0.01*
	31-40		3.55 (0.86)	
	41-50		3.88 (0.75)	
	51-60		3.96 (0.69)	
	61 and over		3.94 (0.69)	
Gender	Male	0.93	3.94 (0.70)	0.04*
	Female		3.69 (0.83)	
Marital Status	Married	0.22	3.88 (0.78)	0.04*
	Single		3.68 (0.839)	
Position in the healthcare industry	General practitioner-family physician	0.01*	3.93 (0.68)	0.01*
	Resident		3.67 (0.66)	
	Specialist		3.94 (0.62)	
	Associate professor		4.38 (0.49)	
	Professor doctor		4.15 (0.75)	
	Nurse-midwife		3.39 (0.91)	
	Other healthcare professionals		3.57 (0.90)	
	Institution		4.04 (0.62)	
University hospital	4.05 (0.59)	3.73 (0.73)		
Training and research hospital	4.01 (0.67)	3.69 (0.94)		
Public hospital	4.02 (0.66)	3.78 (0.81)		
Private health institutions	4.10 (0.55)	3.71 (0.82)		

\*\*Mean: Average Score, SD: Standard Deviation

Table 10 shows that the participants' attitudes toward measures taken and vaccination for the COVID-19 infection did not differ based on with whom the participants lived ( $p > 0.05$ ).

We also noted that the attitudes of the participants toward precautions taken and vaccination for the COVID-19 infection were not different based on changes in their accommodation during the COVID-19 infection process ( $P>0.05$ ).

The participants' attitudes towards measures taken regarding the COVID-19 infection were different according to when they predicted the pandemic would end, with individuals who stated that it would end in  $\leq 12$  months having more positive attitudes ( $P=0.03$ ). The same was true among individuals' attitudes towards vaccination, as those who thought the pandemic would end between 2 and 3 years had more negative attitudes ( $P=0.01$ ).

The attitudes of participants toward measures taken regarding the COVID-19 infection differed based on their working hours, with individuals who worked 51 hours and more having more negative attitudes ( $P=0.03$ ). The same was true for attitudes towards the vaccine; healthcare professionals who worked between 20 and 30 hours per week had more positive attitudes ( $P=0.01$ ).

Table 10: Participants' attitudes toward the COVID-19 infection and vaccine according to their characteristics

		Attitude toward measures taken regarding COVID-19 (Mask, Disinfection)		Attitude toward the COVID-19 Vaccine (Propensity to Trust and Adopt)	
		Mean (SD)**	P-value	Mean (SD)**	P-value
Who lives with you?	Alone	4.02 (0.49)	0.06	3.89 (0.73)	0.10
	Nuclear Family	4.09 (0.55)		3.79 (0.78)	
	Extended Family	3.93 (0.82)		3.63 (0.91)	
Have you changed where you live or stay for COVID-19 infection and being in contact with patients?	Hayır	4.10 (0.57)	0.16	3.84 (0.62)	0.09
	Evet	4.02 (0.66)		3.76 (0.89)	
When do you expect the pandemic process to return to normal?	6 months	4.22 (0.61)	0.03*	3.87 (0.83)	0.01*
	7-12 months	4.23 (0.49)		4.03 (0.67)	
	1-2 years	3.94 (0.66)		3.65 (0.82)	
	>2-3 years	4.00 (0.53)		3.36 (1.05)	
	I do not know	4.04 (0.46)		3.77 (0.74)	
Weekly working hours	20-30	4.21 (0.46)	0.02*	4.05 (0.61)	0.01*
	31-40	4.20 (0.49)		3.84 (0.64)	
	41-50	4.05 (0.45)		3.74 (0.82)	
	$\geq 51$	3.94 (0.51)		3.74 (0.81)	

Table 11 shows that the attitudes of participants toward the vaccine differed based on their preferred vaccine brand. This difference was attributed to the high confidence of the healthcare personnel in vaccination who preferred the Sinovac company vaccine and the low vaccination attitude of those who preferred the vaccine of Gamaleya (Sputnik 5) ( $P=0.01$ ).

Table 11: Attitudes toward vaccination by brand of vaccine

Vaccine Brand to be Made	Attitude Regarding COVID Vaccine (Trusting and Adopting)	
	Mean (SD)**	P-value
Oxford-Astra Zeneca (England)	3.78 (0.76)	0.01*
Moderna (USA)	3.67 (0.69)	
Pfizer-BioNTech (USA+Germany)	3.76 (0.83)	
Gamaleya (Sputnik 5) (Russia)	2.89 (1.02)	
Sinovac (China)	4.13 (0.58)	
Koçak Farma (Turkey)	3.41 (0.82)	

Table 12 shows a significant and positive relationship between the attitudes of the participants toward the measures taken regarding the COVID-19 infection and their attitudes toward the vaccine ( $r = 0.49, P=0.01$ ).

We found a significant and positive relationship between the confidence levels of participants in the Sinovac company vaccine manufactured in China, which will be applied to healthcare workers by our Ministry of Health, and their attitude toward the vaccines ( $r = 0.77, P=0.01$ ).

We found a significantly negative correlation between the number of shifts of the participants and their attitudes toward vaccination ( $r = -0.26, P=0.01$ ).

We also noted that participants' attitudes toward the measures taken against the COVID-19 infection and their level of confidence in the vaccine of the Sinovac company produced in China were more positive, and individuals with a high number of shifts had a lower attitude toward the vaccine.

Table 12: Variables affecting participants' attitude toward vaccination

	Attitude toward the COVID Vaccine (Trusting and Adopting)	
Attitude toward the measures taken for COVID-19 (Mask, Disinfection)	r	0.49
	P	0.01
Trust in the CoronaVac vaccine of Sinovac company, which will be applied to healthcare professionals by our Ministry	r	0.77
	P	0.01
Number of shifts per month	r	-0.26
	P	0.01

## Discussion

The primary goal of health services and staff is to ensure that individuals continue to lead healthy lives. Vaccination is the most effective method of providing protection from infectious diseases [3]. Healthcare professionals who follow scientific innovations and whose knowledge is most sought after to protect public health serve as ambassadors of evidence-based medical interventions and are critical in promoting the adoption of vaccines. Healthcare experts are in the vanguard of the pandemic response fields with a serious risk of occupational SARS-CoV-2 exposure and transmission [8,9]. Healthcare specialists are still considered to be trusted and dynamic national representatives for social health issues [8]. In this context, there is a need to address concerns and raise awareness among healthcare professionals to increase the acceptance of the COVID-19 vaccine [7]. Otherwise, there is a risk of mass rejection of the COVID-19 vaccine by the general population when the vaccine becomes available [7].

Healthcare employees who accept the COVID-19 vaccine and have a confident perspective are more prone to be vaccinated. These data are essential, as the World Health Organization identified vaccine reluctance as one of the ten greatest hazards to overall health in 2019 [10]. In particular, healthcare professionals who work in primary healthcare should convey the message that vaccines are safe and that vaccination is necessary to prevent the epidemic in the community. As a safe and effective COVID-19 vaccine appears to be the only solution for this pandemic, it is imperative that healthcare professionals maintain a positive attitude toward vaccination [11].

The success of vaccination strategies is based on societies' perceptions of the benefits or risks of vaccines and the associated trust in vaccination [12]. In a systematic analysis of 145 articles published in European Union countries, the authors found that the biggest concern in society regarding vaccination was vaccine safety, which often led individuals to conclude that the risks of vaccines outweigh the benefits [13]. In our study, 355 respondents (80.3%) indicated that the biggest drawback in

vaccination was the lack of information on its long-term side effects.

In our research, although the participants accepted the safety, effectiveness, and value of vaccination for public health studies, 28% stated that they were worried about the serious side effects of vaccines, which had an influence on their workforce and social life [8]. Such reservations may cause doubts about the perceived safety of vaccines.

In our survey, we observed that the confidence of residents, nurses, and other health personnel in vaccination were low. Public health officials should take steps to raise the awareness among this important group of professionals, who interact with the public and are often responsible for the direct administration of vaccines during the vaccination phase.

As seen in our results, we found that older age was associated with an increased desire to be vaccinated against COVID-19. This finding is not surprising, as healthcare professionals are familiar with the fact that advanced age is one of the strongest risk factors for COVID-19 mortality. Therefore, it makes sense for elderly healthcare professionals to be given priority in receiving the COVID-19 vaccine in their institutions [10].

Studies have found that an individual's perceived risk of the COVID-19 infection is associated with an increased acceptance of vaccination against COVID-19 among healthcare professionals. Some state that healthcare workers may be reluctant to receive the COVID-19 vaccine if they believe that it does not provide individual protection [14]. In our study, we observed a significant and positive relationship between the attitudes of the participants toward the measures taken regarding the COVID-19 infection and toward the vaccine. However, we also found that the vaccination attitudes of healthcare workers were not at top levels, and, in parallel with the perception of healthcare professionals, the attitudes of the public toward vaccination are also not at the desired level. It is important to broadcast informative public service announcements in the media regarding this issue and eliminate concerns.

Based on the results of our survey, to eliminate vaccination hesitation, there is a need to increase the awareness of vaccination and provide informative, in-service training among residents, nurses, and health officials who are single and aged between 20 and 30 years. Sustaining the gains achieved because of efforts to protect and improve human health is possible only with political determination and social participation. Vaccine hesitation, vaccine rejection, and antivaccination studies, which have developed in recent years in our country and worldwide, damage the progress obtained thus far in the avoidance of virulent epidemics [15, 16].

### Limitations

There are several limitations to this study. First, subjects were recruited and surveyed online rather than face to face, which could lead to bias in the discrete choice experiment study. Another limitation is the fact that the work was cross-sectional and shows only a picture of the community response. We also asked participants to report their intention to receive the COVID-19 vaccine when the current vaccine production begins in the future. A significant number of study participants (12.67%) reported "I have no idea" regarding their intention to obtain the COVID-19

vaccine. Their actual intention may differ when the vaccine is available. This can lead to potential bias when reporting their responses.

Another limitation is that using an internet-based online survey program has become one of the most popular and common ways of collecting data. Preparing the questions to be answered online is the most important part of the questionnaire form. Choosing the right question among dozens of question types ensures high quality data and makes a statistical analysis of data accurate and dependable. However, using such internet-based non-standard survey preparation programs can create bias on research.

### Conclusion

We identify healthcare workers as priority recipients of the COVID-19 vaccine worldwide, because they represent a group at high risk for the transmission of the SARS-CoV-2 infection. In addition, healthcare professionals serve as trusted community workers in public health issues, and their role in promoting the adoption of the COVID-19 vaccine is critical. Hence, reluctance about the SARS-CoV-2 vaccine among healthcare specialists must be eradicated to improve the public's attitude toward the COVID-19 vaccine. Vaccine hesitation in a pandemic is a major obstacle to implementing vaccination campaigns. To continue the benefits of vaccination programs and implement the vaccination successfully, it is crucial to understand and address the vaccine hesitations among healthcare professionals.

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