



# Attitudes Towards the COVID-19 Vaccine: What do Healthcare Professionals Think About the COVID-19 Vaccine?

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## Abstract

**Objective:** This study was conducted to evaluate the thoughts and attitudes of healthcare professionals towards coronavirus disease-2019 (COVID-19) vaccines in the first days of vaccination.

**Methods:** The study was conducted between January and February 2021 at a state hospital. Ethics committee approval and research permission from the Ministry of Health were obtained before starting the study. Participants were asked to fill out the opinion form via Google Forms. The data were evaluated in the SPSS 21 program.

**Results:** One hundred and sixty of the health workers were women and their mean age was 37.27±9.21 years. Majority of healthcare workers (74.8%) wanted to have any COVID-19 vaccine, and these vaccines were Sinovac-China (58.7%) Biontech/Pfizer Vaccine-Germany (28.3%), Oxford/Astra Zeneca Vaccine-England, respectively (5.3%), Sputnik Vaccine-Russia (4.0%), and Moderna Vaccine-United States (3.6%). Positive attitude towards the COVID-19 vaccine mean score was 3.56±0.88; the mean score of negative attitude was found to be 3.30±0.70 ( $p>0.05$ ). The mean score of positive attitude towards the COVID-19 vaccine was found to be significantly higher in healthcare professionals with a master's/doctorate education, compared to those with a lower education level.

**Conclusion:** In our study, it was determined that health workers had positive attitudes towards the COVID-19 vaccine and their negative attitudes were low. The perceptions and attitudes of healthcare professionals, who are at the forefront of the fight against the epidemic, towards COVID-19 vaccines are invaluable both in managing the epidemic and in achieving success in combating the epidemic. Multidisciplinary and multidisciplinary studies are needed to increase COVID-19 vaccination rates.

**Keywords:** COVID-19 vaccine, idea, attitude, health workers

## INTRODUCTION

The new type of coronavirus disease-2019 (COVID-19), which affected the whole world and our country, emerged in the city of Wuhan, China towards the end of 2019 and still continues its effect. To date, more than 396,619,286 cases of COVID-19 have been recorded worldwide, and 5,746,187 deaths have occurred due to this disease (1). There is no officially approved drug for the treatment of the disease. One of the most

important components in controlling the COVID-19 pandemic is to provide the highest level of immunity of the population with an effective and safe vaccine (2). With the emergence of COVID-19, vaccine studies have accelerated, and more than a hundred companies or academic institutions around the world are working on COVID-19 vaccines with methods including recombinant vectors, mRNA, DNA, inactivated virus, live attenuated virus, virus-like particles, and protein subunits in lipid nanoparticles (3). Approved COVID-19 vaccines in use;



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RNA-based virus vaccines (Moderna and Pfizer/Biontech) mRNA-1273, inactivated virus vaccine (Sinovac), viral vector vaccine (AstraZeneca/Oxford), ChAdOx1 and BNT162b2 vaccines (4). As of April 21, 2021, there are 14 vaccines approved and started to be used in at least one country (5). The number of individuals vaccinated worldwide is 4.14 billion, and the vaccination rate is 53%. In Turkey, the number of individuals vaccinated is 57.49 million and the vaccination rate is 67.60% (6). Considering the still increasing number of cases and death rates around the world; it can be thought that the vaccination rate is still not at a sufficient level.

Due to occupational risks, healthcare workers are at risk of many infections. Throughout the COVID-19 global pandemic, healthcare professionals at the forefront of combating the epidemic continued to implement high-risk procedures. Protection of healthcare workers from infections plays an important role in controlling hospital-acquired infection transmission (7). One of the most important components in controlling the COVID-19 global epidemic is to ensure the highest level of immunity of the population with an effective and safe vaccine. While immunization has successfully reduced the global burden of disease and death, reliance on vaccines may be affected by several concerns. Despite the COVID-19 pandemic, there is a global distrust of vaccine safety and efficacy (8). Mutations in the COVID-19 virus can increase disease transmission and spread, and reduce the effect of protective antibodies formed by infection and vaccine (9). In addition, the absence of any drug or therapeutic agent clinically approved by the US Food and Drug Administration for the treatment of COVID-19 and mutations in the virus may cause hesitancy to accept the vaccine in individuals (10). It is thought that general vaccine hesitations have an impact on the acceptance of the COVID-19 vaccine. Vaccine hesitancy can lead to delays and vaccine rejection, and even contribute to increased disease transmission (11). Understanding healthcare professionals' hesitations about vaccines can contribute to increased acceptance and rates of COVID-19 vaccines. The aim of this study is to evaluate the thoughts and attitudes of healthcare professionals towards the COVID-19 vaccine in the first days of vaccination.

## METHODS

### Place and Time of Research

Descriptive cross-sectional this study was conducted at Sakarya Yenikent State Hospital (SYDH) between January 25 and February 8, 2021.

### The Universe and Sample of the Research

The population of the study consisted of 507 healthcare professionals working at SYDH between January and February 2021. The sampling method was carried out using the convenience sampling technique. Among the health workers working in SYDH, 254 health workers participated in the study on a voluntary basis, and 254 health workers formed the sample of the study.

### Data Collection Tools

**Demographic Data and Descriptive Features Form:** It consists of 39 questions containing demographic data of healthcare professionals, information on COVID-19 disease and vaccines.

**Attitudes Towards COVID-19 Vaccine Scale:** This scale, developed by Geniş et al. (12) to assess attitudes towards COVID-19. Vaccine and validated and validated, consists of five Likert-type (1: strongly disagree; 5: strongly agree) and nine items (12). The scale has two sub-dimensions, positive and negative attitudes. Items in the negative attitude sub-dimensions are scored inversely. The total score is obtained by summing the item scores in the scale sub-dimension and the total score is divided by the number of items in that sub-dimension. The higher the score obtained from the positive attitude sub-dimension in the scale, the more positive the attitude towards the vaccine, and the higher the score in the negative attitude sub-dimension, the less negative attitude towards the vaccine. The Cronbach Alpha value of the scale was found to be 0.80 (12,13).

### Ethical Approval of Research

The ethics committee of the study was obtained from the Sakarya University Faculty of Medicine Ethics Committee (dated: 15.01.2021 and numbered: E-71522473-050.01.04-595709). In the same period, research permission was obtained from the Ministry of Health Scientific Research Studies.

### Data Collection

After obtaining the necessary permissions, healthcare professionals working in SYDH and agreeing to participate in the research were asked to fill out the interview form via google survey. Data collection took approximately eight minutes for each participant.

### Statistical Analysis

SPSS 22.0 (Statistical Package for Social Sciences) package program was used for statistical analysis of the data. Display of study data; frequency distribution (number, percentage) for categorical variables and descriptive statistics (mean, standard deviation, median, interquartile range) for numerical variables were given.

The compatibility of the data with the normal distribution was evaluated with the Kolmogorov-Smirnov test ( $p > 0.05$ ). Since our data did not show normal distribution, the level of significance between groups was evaluated with Mann-Whitney U test and Kruskal-Wallis test, and One-Way analysis ANOVA was used to examine the difference between categorical variables with more than two groups. Spearman correlation coefficient was used to determine whether there was a relationship between the variables. Cronbach's alpha value was used for scale reliability. Cronbach's alpha coefficient of the Attitudes Towards COVID-19 vaccine scale was 0.881 for positive attitudes; it was determined as 0.762 for negative attitudes. It was seen that the reliability of both attitudes of the scale was high.

## RESULTS

One hundred and sixty (63.0%) of the participants were female and their mean age was  $37.27 \pm 9.21$  years. When the distribution of health workers according to their educational status is examined; 9.1% of the healthcare professionals were primary school graduates, 14.2% secondary education, 20.5% associate degree, 37.4% undergraduate, 6.3% postgraduate and 12.6% doctorate graduates. The distribution by profession is; 11.8% were doctors, 42.9% nurses, 2.0% administrators, 11.8% were technicians/technicians, 10.6% were cleaners and 9.8% were from other professions. The mean duration of service was  $13.30 \pm 8.70$  years. 7.9% of the healthcare professionals were in the emergency unit, 1.2% in the operating room, 4.3% in the COVID emergency unit, 13.0% in the COVID service, 7.1% in the COVID intensive care unit, 12.2% in the outpatient clinic, 2.8% were working in the laboratory, 2.4% in the technical service, 11.0% in the inpatient service/clinic, 8.3% in the intensive care unit and 14.2% in other units. While 78.3% of healthcare workers do not have a chronic disease; 21.7% had at least one chronic disease. When the distribution of chronic diseases is examined; of the healthcare workers, 30.9% had hypertension, 20.0% diabetes mellitus, 10.9% allergic asthma, 12.7% heart disease, 12.7% Hashimoto's thyroid, and 12.7% other chronic diseases (these findings are not shown in the table). Demographic characteristics of healthcare workers who want and do not want to be vaccinated and information about COVID-19 are shown in Table 1.

24.4% of healthcare workers reported that they had COVID-19 disease, 35.8% of them had a family history of COVID-19 infection, and 49.6% of them reported that there were people who lost their lives due to COVID-19. 52.4% stated that they received vitamin/mineral/herbal support therapy to prevent COVID-19 disease. While 34.8% of those who took vitamin/drug

supplements took vitamin C, 31.6% took vitamin D and 15.9% took zinc; 15.9% were taking herbal tea and 1.8% were taking omega-3 and propolis (these findings are not shown in the table).

78.9% of healthcare workers were exposed to questions about COVID-19 infection and vaccines, and 86.6% thought that there was information pollution about COVID-19 disease and vaccine. While 61.0% of healthcare professionals have confusion about COVID-19 disease and vaccines; 27.6% reported that they believed in conspiracy theories. Again, 52.8% stated that they had the opportunity to look at the results of the COVID-19 vaccine studies; 63.0% found the studies on the vaccine sufficient. More than half of the participants (69.7%) stated that they think the vaccine is effective and they trust the COVID-19 vaccines (64.2%). However, 62.2% reported that they found the information provided about the COVID-19 vaccine insufficient. When the information sources of those included in the research are examined; 27.8% are from the statements of the Ministry of Health, 50.7% are infectious disease specialists/microbiologists, 50.0% are from social media, 41.7% are from television programs/news and 32.6% are from social media (Facebook, Instagram, Twitter, LinkedIn etc.) (these findings are not shown in the table).

The majority of healthcare professionals (74.8%) wanted to be vaccinated against any COVID-19 vaccine, and to which COVID-19 vaccine they were asked; Sinovac-China (58.7%) Biontech/Pfizer Vaccine-Germany (28.3%), Oxford/Astra Zeneca Vaccine-England (5.3%), Sputnik V Vaccine-Russia (4.0%), and Moderna Vaccine-United States (3.6%). He stated that they wanted to be vaccinated. When the factors affecting their vaccination are evaluated; according to the information obtained from television programs, 87.4% of the employees will protect themselves, their families and friends, 89.0% will protect the vaccine community, 88.2% will normalize the people, 54.7% will fulfill the requirements of the institution they work for, 30.3%. According to the information obtained from the internet/social media, 28.3% of them stated that they would be vaccinated because 28.7% wanted their family, 18.9% their friends to be vaccinated, and 16.1% said that they would be vaccinated because there might be a travel restriction for those who are not vaccinated. Despite this, 42.5% stated that they believed in natural and traditional methods of protection from infections and 3.5% stated that they would not be vaccinated due to their religious beliefs; 25.6% stated that they were afraid of vaccines/injections.

When the values of the scales in Table 2 were examined, it was determined that the Cronbach's alpha values were in the range of 0.762-0.881 and the level of reliability was high. In the study, the mean score of the positive attitude towards the COVID-19

		<b>Accepting the COVID-19 vaccine (n=190)</b>	<b>Not accepting the COVID-19 vaccine (n=64)</b>	<b>p value</b>
<b>Age</b>		37.8±9.5 (22.0-60.0) 38.0	37.0±9.1 (20.0-62.0) 38.0	0.577
<b>Gender</b>	Male	77 (40.5)	17 (26.6)	<b>0.045</b>
	Female	113 (59.5)	47 (73.4)	
<b>Education status</b>	Primary education	17 (8.9)	6 (9.4)	0.917
	High school	27 (14.2)	9 (14.1)	0.976
	Associate degree	39 (20.5)	13 (20.3)	0.970
	Licence	66 (34.7)	29 (45.3)	0.130
	Degree	13 (6.8)	3 (4.7)	0.539
	Doctorate	28 (14.7)	4 (6.3)	0.076
<b>Profession</b>	Doctor	26 (13.7)	4 (6.3)	0.110
	Nurse/midwife	82 (43.2)	27 (42.2)	0.892
	Manager	4 (2.1)	1 (1.6)	0.786
	Technician/technician	23 (12.1)	7 (10.9)	0.802
	Medical secretary	22 (11.6)	6 (9.4)	0.626
	Cleaning staff	17 (8.9)	10 (15.6)	0.133
	Other	16 (8.4)	9 (14.1)	0.383
<b>Worked unit</b>	Emergency unit	15 (7.9)	5 (7.8)	0.983
	Operating room	2 (1.1)	1 (1.6)	0.744
	COVID emergency unit	8 (4.2)	3 (4.7)	0.871
	COVID clinic	24 (12.6)	9 (14.1)	0.768
	COVID intensive care unit	11 (5.8)	7 (10.9)	0.165
	Other units	23 (12.1)	13 (20.3)	0.103
	Administrative units	33 (17.4)	7 (10.9)	0.221
	Laboratory	7 (3.7)	0	0.119
	Policlinic	26 (13.7)	5 (7.8)	0.214
	Technical service	6 (3.2)	0	0.150
	Inpatient/clinic	19 (10.0)	9 (14.1)	0.369
intensive care unit	16 8.4)	5 (7.8)	0.878	
<b>Chronic disease presence</b>		43 (22.6)	12 (18.8)	0.514
<b>Information about COVID-19 disease</b>	Having a COVID-19 disease	41 (21.6)	21 (32.8)	0.070
	Presence of people with a family history of COVID-19	68 (35.8)	23 (35.9)	0.982
	Presence of people who lost their lives due to COVID-19 disease in the environment	97 (51.1)	29 (45.3)	0.426
	Taking supplements/vitamins in prevention of COVID-19 disease	100 (52.6)	33 (51.6)	0.882
	Frequent exposure to questions about the COVID-19 illness	152 (80.0)	46 (71.9)	0.175
	Presence of information pollution related to COVID-19	165 (86.8)	55 (85.9)	0.854
	Believing in conspiracy theories about COVID-19	49 (25.8)	21 (32.8)	0.276

**Table 1. Continued**

		Accepting the COVID-19 vaccine (n=190)	Not accepting the COVID-19 vaccine (n=64)	p value
<b>Age</b>		37.8±9.5 (22.0-60.0) 38.0	37.0±9.1 (20.0-62.0) 38.0	0.577
<b>Information on the COVID-19 vaccine</b>	Confusion about COVID-19 vaccines	103 (54.2)	52 (81.3)	<b>0.001</b>
	I believe in the ethics of the COVID-19 vaccine	167 (87.9)	10 (15.6)	<b>0.001</b>
	I trust the COVID-19 vaccine	158 (83.2)	5 (7.8)	<b>0.001</b>
	I looked at the COVID-19 vaccine study results	108 (56.3)	26 (42.2)	<b>0.024</b>
	I find the COVID-19 vaccine studies sufficient	106 (55.8)	54 (84.4)	<b>0.001</b>
	I find the information about the COVID-19 vaccine sufficient	89 (46.8)	7 (10.9)	<b>0.001</b>
	I will be vaccinated according to the information I got from the television programs	76 (40.0)	1 (1.6)	<b>0.001</b>
	I will be vaccinated according to the information I got from the internet	68 (35.8)	4 (6.3)	<b>0.001</b>
	I will be vaccinated because my family wants me to get the COVID-19 vaccine	66 (34.7)	7 (10.9)	<b>0.001</b>
	I will be vaccinated because my friends asked me to get the COVID-19 vaccine	43 (22.6)	5 (7.8)	<b>0.008</b>
	I will be vaccinated against COVID-19 due to the institution I work for	123 (64.7)	16 (25.0)	<b>0.001</b>
	If the COVID-19 vaccine will protect me, my family and my friends, I will get vaccinated	173 (91.1)	49 (76.6)	<b>0.002</b>
	If the COVID-19 vaccine will protect the community, I will be vaccinated	175 (92.1)	51 (79.7)	<b>0.006</b>
	If the COVID-19 vaccine will normalize the public, I will be vaccinated	173 (91.1)	51 (79.7)	<b>0.014</b>
	I'm afraid of vaccines/injections	40 (21.1)	25 (39.1)	<b>0.004</b>
I will not be vaccinated for COVID-19 due to my religious beliefs	6 (3.2)	3 (4.7)	0.566	
I will be vaccinated as there will be a travel restriction for those who are not vaccinated for COVID-19	29 (15.3)	12 (18.8)	0.511	

COVID-19: Coronavirus disease-2019

**Table 2. Distribution of the mean scores of the sub-dimensions of the attitudes towards COVID-19 vaccine of healthcare professionals**

Scales	Number of items	X ± SD	Minimum point	Maximum point	Median	Cronbach's alpha	Varriance
<b>Positive attitude towards COVID-19 vaccine</b>	4	3.56±0.88	1	5	3.75	0.881	12.664
<b>Negative attitude towards COVID-19 vaccine</b>	5	3.30±0.70	1	5	3.40	0.762	12.393

COVID-19: Coronavirus disease-2019, SD: Standard deviation

vaccine of the health workers was calculated as 3.56±0.88 and the mean score of the negative attitude towards the COVID-19 vaccine was calculated as 3.30 ± 0.70 (Table 2).

When the descriptive characteristics of the participants (age, gender, educational status, occupation, unit of work, presence of

chronic disease, COVID-19 status etc.) and the attitudes towards COVID-19 vaccine scale score values are compared; there was no statistically significant difference between the mean scores of positive and negative attitudes towards the COVID-19 vaccine according to the variable of having COVID-19 (p>0.05) (Table 3). However, the mean score of positive attitude towards

<b>Table 3. Comparison of the score values of the attitudes towards COVID-19 vaccine scale according to the descriptive characteristics of healthcare professionals</b>		
	<b>Positive attitude towards COVID-19 vaccine</b> $X \pm SD/Q_2 (Q_1-Q_3)^*$	<b>Negative attitude towards COVID-19 vaccine</b> $X \pm SD/Q_2 (Q_1-Q_3)^*$
<b>Age</b>		
20-35 years	3.75 (3.00-4.00)	3.40 (3.00-3.80)
36-50 years	3.75 (3.00-4.25)	3.20 (2.80-3.80)
51-65 years	4.00 (3.18-4.56)	3.30 (2.80-4.00)
p	0.267	0.484
<b>Gender</b>		
Male	3.61±0.82	3.25±0.73
Female	3.52±0.92	3.32±0.68
t	0.803	-0.755
p	0.423	0.451
<b>Education status</b>		
Primary education	3.51±1.09	3.03±0.69
High school	3.56±1.07	3.46±0.74
Associate degree	3.51±0.85	3.28±0.73
Licence	3.40±0.81	3.23±0.68
Degree	3.85±0.70	3.48±0.58
Doctorate	3.98±0.73	3.45±0.67
F	2.502	1.723
p	<b>0.031</b>	0.130
<b>Profession</b>		
Doctor	3.93±0.72	3.40±0.67
Nurse/midwife	3.50±0.80	3.31±0.65
Manager	3.20±1.19	3.52±0.84
Technician/technician	3.73±0.86	3.40±0.61
Cleaning staff	3.41±1.09	2.95±0.69
Medical secretary	3.56±0.98	3.27±0.85
Other	3.42±0.96	3.40±0.79
F	1.528	1.486
p	0.169	0.184
<b>Worked unit</b>		
COVID emergency unit	3.20±1.02	3.36±0.70
COVID clinic	3.43±0.63	3.12±0.59
COVID intensive care unit	3.52±0.96	3.01±0.60
Emergency unit	3.80±1.08	3.20±1.10
Operating room	3.75±0.75	3.13±0.50
Intensive care unit	3.25±0.81	3.43±0.64
Inpatient/clinic	3.48±0.97	3.07±0.70
Policlinic	3.63±0.83	3.50±0.58
Administrative units	3.73±0.91	3.35±0.71
Laboratory	4.46±0.50	3.48±0.45
Technical service	3.79±0.43	3.76±0.38
Other units	3.43±0.90	3.42±0.68
F	1.581	1.556
p	0.105	0.113
<b>Chronic disease</b>		
Yes	3.59±0.93	3.30±0.74
No	3.55±0.87	3.30±0.69
t	0.305	-0.16
p	0.760	0.987
<b>Contracting a COVID-19 infection</b>		
Yes	3.52±1.00	3.19±0.87
No	3.57±0.85	3.33±0.64
t	-0.435	-1.175
p	0.664	0.243

<b>Table 3. Continued</b>		
	<b>Positive attitude towards COVID-19 vaccine <math>X \pm SD/Q_2 (Q_1-Q_3)^*</math></b>	<b>Negative attitude towards COVID-19 vaccine <math>X \pm SD/Q_2 (Q_1-Q_3)^*</math></b>
<b>Family history of COVID-19 infection</b>		
Yes	3.75 (3.00-4.50)	3.20 (2.80)
No	3.75 (3.00-4.00)	3.40 (3.00-3.80)
U	-1.611	-0.893
p	0.107	0.372
<b>Presence of people who have died from COVID-19 in your environment</b>		
Yes	3.75 (3.00-4.06)	3.40 (3.00-3.60)
No	3.75 (3.00-4.00)	3.40 (2.80-3.80)
U	-0.853	-0.133
p	0.394	0.894
<b>Taking vitamin/drug supplements to prevent COVID-19</b>		
Yes	3.75 (3.00-4.12)	3.40 (2.80-3.60)
No	3.75 (3.00-4.00)	3.40 (2.80-3.60)
U	-0.821	-0.844
p	0.412	0.398
<b>Exposure to COVID-19 questions</b>		
Yes	3.75 (3.00-4.00)	3.40 (3.00-3.80)
No	3.75 (3.00-4.00)	3.30 (2.80-3.75)
U	-0.412	-0.920
p	0.681	0.358
<b>Disinformation about COVID-19</b>		
Yes	3.75 (3.00-4.00)	3.40 (3.00-3.80)
No	3.75 (2.93-4.50)	3.10 (2.55-3.80)
U	-0.529	-1.624
p	0.597	0.104
<b>Believing in COVID-19 conspiracy theories</b>		
Yes	3.12±0.85	3.11±0.65
No	3.73±0.84	3.37±0.70
t	-5.116	-2.669
p	<b>0.001</b>	<b>0.008</b>
<b>State of confusion regarding the COVID-19 vaccine</b>		
Yes	3.25 (3.00-3.75)	3.20 (2.80-3.60)
No	4.00 (3.75-4.75)	3.60 (3.20-4.00)
U	-5.931	-6.305
p	<b>0.001</b>	<b>0.001</b>
<b>Believing in the effectiveness of the COVID-19 vaccine</b>		
Yes	4.00 (3.50-4.50)	3.60 (3.20-3.80)
No	3.00 (2.50-3.00)	2.80 (2.60-3.20)
U	-9.713	-7.369
p	<b>0.001</b>	<b>0.001</b>
<b>Confidence status of the COVID-19 vaccine</b>		
Yes	4.00 (3.75-4.50)	3.60 (3.20-4.00)
No	3.00 (2.25-3.25)	3.00 (2.60-3.40)
U	-9.979	-6.812
p	<b>0.001</b>	<b>0.001</b>

Table 3. Continued		
	Positive attitude towards COVID-19 vaccine $X \pm SD/Q_2 (Q_1-Q_3)^*$	Negative attitude towards COVID-19 vaccine $X \pm SD/Q_2 (Q_1-Q_3)^*$
<b>Have you had the opportunity to look at the COVID-19 vaccine study results?</b>		
Yes	3.66±0.992	3.40±0.66
No	3.44±0.83	3.18±0.72
t	2.03	2.558
p	<b>0.043</b>	<b>0.011</b>
<b>Finding sufficient studies on the COVID-19 vaccine</b>		
Yes	3.50 (3.00-4.00)	3.20 (2.80-3.60)
No	4.00 (3.50-4.50)	3.60 (3.00-3.80)
U	-4.354	-2.899
p	<b>0.001</b>	<b>0.004</b>
<b>Finding sufficient information about the COVID-19 vaccine</b>		
Yes	4.00 (3.75-4.50)	3.60 (3.20-4.00)
No	3.25 (2.75-3.75)	3.20 (2.80-3.60)
U	-6.363	-3.910
P	<b>0.001</b>	<b>0.001</b>
<b>Wanting to be vaccinated against COVID-19</b>		
Yes	4.00 (3.50-4.50)	3.40 (3.00-3.80)
No	2.75 (2.00-3.00)	2.80 (2.60-3.20)
U	-10.049	-6.368
p	<b>0.001</b>	<b>0.001</b>
<b>According to the information I got from the TV, I will be vaccinated</b>		
Yes	3.92±0.78	3.55±0.72
No	3.40±0.88	3.19±0.66
t	4.704	3.834
p	<b>0.001</b>	<b>0.001</b>
<b>I will be vaccinated according to the information I have obtained from the internet/social media</b>		
Yes	3.86±0.83	3.59±0.69
No	3.44±0.88	3.18±0.67
t	3.430	4.244
p	<b>0.001</b>	<b>0.001</b>
<b>I will be vaccinated because my parents want me to be vaccinated</b>		
Yes	3.66±0.77	3.31±0.69
No	3.52±0.93	3.29±0.71
t	1.246	0.132
p	0.215	0.895
<b>I'll be vaccinated because my friends want me to be</b>		
Yes	3.67±0.81	3.28±0.78
No	3.53±0.90	3.30±0.68
t	0.941	-216
p	0.347	0.829
<b>I will be vaccinated because the institution I work for wants me to be</b>		
Yes	3.75 (3.25-4.25)	3.40 (3.00-3.80)
No	3.50 (2.75-4.00)	3.20 (2.80-3.60)
U	-2.930	-2.226
p	<b>0.003</b>	<b>0.026</b>

Table 3. Continued		
	Positive attitude towards COVID-19 vaccine $X \pm SD/Q_2 (Q_1-Q_3)^*$	Negative attitude towards COVID-19 vaccine $X \pm SD/Q_2 (Q_1-Q_3)^*$
<b>If the vaccine will protect me, my family and my friends, I will get vaccinated</b>		
Yes	3.75 (3.00-4.00)	3.40 (3.00-3.80)
No	3.25 (2.00-4.50)	3.50 (2.80-3.60)
U	-1.635	-0.269
p	0.102	0.788
<b>I will be vaccinated if the vaccine will protect society</b>		
Yes	3.75 (3.00-4.00)	3.40 (3.00-3.80)
No	3.00 (2.00-4.00)	3.40 (2.80-3.80)
U	-2.044	-0.167
p	<b>0.041</b>	0.867
<b>I will be vaccinated if the vaccine will normalize the people</b>		
Yes	3.60±0.84	3.28±0.70
No	3.24±1.15	3.42±0.67
U	1.667	-1.023
p	0.105	0.307
<b>Fear of injections/vaccinations</b>		
Yes	3.16±0.83	3.13±0.68
No	3.69±0.86	3.36±0.70
t	-4.321	-2.245
p	<b>0.001</b>	<b>0.026</b>
<b>Believing in traditional solutions</b>		
Yes	3.50 (3.00-4.00)	3.20 (2.80-3.60)
No	3.75 (3.00-4.50)	3.40 (3.00-3.80)
U	-2.524	-1.835
p	<b>0.012</b>	0.067
<b>Not wanting to be vaccinated due to religious belief</b>		
Yes	3.00±1.06	2.73±0.80
No	3.58±0.87	3.32±0.69
t	-1.944	-2.498
p	0.053	<b>0.013</b>
<b>Requesting vaccination due to travel restriction</b>		
Yes	3.36±0.80	3.12±0.72
No	3.60±0.90	3.33±0.69
t	-1.554	-1.808
p	0.121	0.072

COVID-19: Coronavirus disease-2019, SD: Standard deviation

the COVID-19 vaccine was found to be significantly higher in healthcare workers with a master's/doctorate education compared to those with a lower education level ( $p < 0.05$ ).

In the study, those who do not believe in conspiracy theories about COVID-19 compared to those who believe in conspiracy theories; according to those who are not confused about the COVID-19 infection and vaccine, and those who are confused about the subject; according to those who believe in the effectiveness of the COVID-19 vaccine and those who do not believe in the effectiveness of the vaccine; according to those who trust the COVID-19 vaccine and those who do not; according

to those who look at the results of the COVID-19 vaccine studies and do not look at the results of the vaccination studies; according to those who do not find the COVID-19 vaccine studies sufficient; according to those who find the information about the COVID-19 vaccine sufficient; according to those who want to be vaccinated against COVID-19 and those who do not want to be vaccinated; according to the information obtained from television, those who want to be vaccinated according to the information obtained from television, according to those who do not want to be vaccinated; according to the information obtained from the internet/social media, those who want to

be vaccinated according to the information obtained from the internet/social media, according to those who do not want to be vaccinated; According to those who want to be vaccinated because the institution they work for wants to be vaccinated, and therefore do not want to be vaccinated; those who were not afraid of injections/vaccines had higher positive and negative attitudes towards the COVID-19 vaccine and were statistically significant ( $p<0.05$ ).

In addition, among the healthcare professionals participating in the research, if the COVID-19 vaccine will protect the society, those who want to be vaccinated compared to those who do not want to be vaccinated; it was determined that those who do not believe in traditional solutions have a higher mean score of positive attitudes towards the COVID-19 vaccine than those who believe in these solutions and are statistically significant ( $p<0.05$ ). Those who did not decide according to their religious beliefs and thought about getting vaccinated had higher negative attitudes towards the COVID-19 vaccine than those who did not think about getting vaccinated because of their religious beliefs, and were evaluated as statistically significant ( $p<0.05$ ).

## DISCUSSION

One of the most important components in controlling the COVID-19 epidemic is to provide the highest level of community immunity with an effective and safe vaccine. Vaccination is an extremely safe, effective and inexpensive method for the prevention of infectious diseases (14). The aim of vaccination is to protect human health by preventing severe disease, morbidity and mortality. It has been reported that mortality due to the disease decreased significantly in the country where the disease was detected, with an effective vaccination strategy and sufficient immunity to be achieved (15). It has been reported that the immunization rate among individuals can be between 55% and 82% depending on the COVID-19 prevention and control strategies in a society (16). This rate may vary between regions and even countries depending on the socio-economic situation, regional differences and the sensitivity of the society. In a study conducted with healthcare professionals, it was reported that approximately two-fifths of healthcare professionals ( $n=92$ , 39.3%) agreed to receive the COVID-19 vaccine (17). In the study conducted by Roy et al. (18) on healthcare workers, it was reported that only 63% of healthcare workers would be vaccinated against COVID-19. In a study conducted in Iran, it was stated that only 64.3% of the participants agreed to receive any COVID-19 vaccine, and in a study conducted in Kenya, 52.4% of Kenyans were willing to receive a COVID-19 vaccine (19). In our study, according to the literature, it was determined that the

participants were more willing (74.8%) to receive any COVID-19 vaccine. It was thought that the high rate in our study was due to the fact that the COVID-19 vaccination program initiated in our country was given priority to the vaccine and that health workers had easy access to the vaccine.

At the beginning of the factors affecting the success of vaccination are individuals' perceptions and trust towards the vaccine. In a study conducted with healthcare professionals in the USA; although it is stated that the vast majority of healthcare workers are willing to be vaccinated in the first wave of the COVID-19 pandemic, it has been reported that one out of every six healthcare workers is reluctant to be vaccinated due to concerns arising from the lack of information about the efficacy and safety of the vaccine. In addition, it was found in the study that healthcare professionals have very strong negative feelings about allergies that may develop after vaccination, indicating their distrust of the vaccine (18). In the study of Agyekum et al. (17); it has been reported that the vast majority of healthcare workers (64.5%) are reluctant to accept COVID-19 vaccines due to their concerns about the safety of vaccines. In our study, it was seen that healthcare professionals trust the COVID-19 vaccines at a rate of 64.2% and this confidence rate is similar to the literature. It was thought that this confidence rate may be due to the high rate of information pollution (86.6%) by healthcare professionals regarding COVID-19 vaccines. We believe that the level of confidence in and acceptance of the vaccine can be increased by identifying the factors that will affect the confidence of healthcare professionals towards the vaccine and developing vaccination strategies for this.

In our study, there was no statistically significant difference between the positive and negative attitude scores of healthcare professionals according to age, gender, occupation, unit of work and chronic disease variables ( $p>0.05$ ); a significant difference was found in the positive attitude score according to the profession variable ( $p<0.05$ ). In the study of Çopur and Karasu (20), there was no significant difference in the positive and negative attitudes of individuals towards the vaccine according to gender ( $p>0.05$ ); it has been reported that there is a significant difference in negative attitude scores according to age and in positive and negative attitude scores according to the presence of chronic disease ( $p<0.005$ ). Elmaoğlu et al. (21), in their study evaluating the relationship between the perception of COVID-19 control in individuals and the attitude towards the COVID-19 vaccine, reported that the positive and negative attitude scores of individuals towards the COVID-19 vaccine were similar according to age (respectively,  $p=0.0450$ ;  $p=0.271$ ). In a study, when the score ratios of positive-negative attitudes

towards the vaccine were evaluated according to gender, it was reported that there was a significant difference between males and females in the rates of positive attitudes and that males had a more positive attitude towards the vaccine than females (22). In a study evaluating individuals' attitudes towards the COVID-19 vaccine; the positive attitude mean scores of women were significantly higher than men's; it was stated that negative attitude scores were similar according to gender (21). In our study, positive vaccination attitude scores of healthcare professionals with higher education levels were found to be significantly higher. However, negative vaccination attitudes are similar. In the study conducted by Elmaoğlu et al. (21), individuals with high educational status had significantly higher positive attitude scores towards the vaccine; negative attitude scores were reported to be similar. In a study examining the willingness to vaccinate against COVID-19 in China, it was reported that the majority of individuals willing to be vaccinated were university graduates, and there was a statistically significant relationship between education level and willingness to be vaccinated (23). In another study; It has been shown that undergraduate and graduate students are more willing to be vaccinated and there is a significant difference between vaccinated status according to education level (24). The results of our study are similar to the literature; it has been seen that those who want to be vaccinated are in the majority and those with a higher education level are more willing to be vaccinated. It was thought that this result was related to seeing the vaccine as an important factor in protection from the epidemic, that education also increased this awareness, and accordingly, the attitude of health professionals to be vaccinated positively.

In our study, it was observed that the status of having COVID-19 and the scores of positive and negative attitudes towards the vaccine were similar ( $p>0.05$ ). In the study conducted by Yıldız et al. (22), it was reported that there is a significant difference in the positive attitude factor towards the vaccine in case of having COVID-19. In the study, the average of the participants who had COVID-19 was determined as 2.52 and the average of the participants who did not have COVID-19 was determined as 2.06, and it was shown that those who had COVID-19 had a more positive attitude towards the vaccine than those who did not have COVID-19. In the same study, it was reported that there was a significant difference in the mean score of negative attitude towards the vaccine in case of having COVID-19 ( $p<0.05$ ). The average score of the participants who had COVID-19 was 1.64, and the group average of the participants who did not have COVID-19 was 1.81. It is observed that participants who do not have COVID-19 have a more negative attitude towards the

vaccine compared to participants who have had COVID-19 (20). In the study of Elmaoğlu et al. (21); it has been reported that the positive and negative attitude scores towards the vaccine are similar according to the COVID-19 positivity in the family of the individuals (respectively,  $p=0.282$ ;  $p=0.259$ ).

In another study evaluating attitudes towards COVID-19 vaccines, it was reported that there was no significant difference in attitudes towards vaccines compared to the statements of the Ministry of Health, which is the most trusted source of information on positive-negative vaccine attitudes, and TV programs, which are the least trusted source ( $p>0.05$ ) (20). In our study, it was determined that there was a significant difference between positive vaccination attitude scores between the information obtained from TV and the variable of wanting to be vaccinated according to the information obtained from the internet/social media ( $p>0.05$ ). According to the information obtained from TV and internet/social media, the positive vaccine attitude scores of health workers who wanted to be vaccinated for COVID-19 were higher. It is thought that healthcare professionals follow up-to-date information about COVID-19 vaccines on TV and internet/social media and accordingly have a positive attitude towards vaccines.

## CONCLUSION

In our study, it was concluded that healthcare professionals want to be vaccinated if COVID-19 vaccines will protect themselves, their family, friends and society, they trust COVID-19 vaccines, and healthcare professionals who do not want to be vaccinated against COVID-19 have confusion about COVID-19 vaccines. In addition to the implementation of strict measures in controlling and stopping the COVID-19 pandemic, the most important element is undoubtedly vaccination. Training, symposiums and panels should be organized in order to increase vaccination rates and prevent information pollution and confusion about vaccines, and the information and sharing should be clear, reliable and informative.

## Ethics

**Ethics Committee Approval:** Ethics committee approval of the study was obtained from the Sakarya University Faculty of Medicine Ethics Committee (dated 15.01.2021; E-71522473-050.01.04-595709). In the same period, the Ministry of Health's Scientific Research approval was also obtained.

**Informed Consent:** Before starting the study, online participation approval was obtained from each healthcare worker.

**Peer-review:** Externally peer-reviewed.

## Authorship Contributions

Concept: G.K., P.Ö.O., Ş.T., D.A., Design: G.K., P.Ö.O., Ş.T., D.A., Data Collection or Processing: G.K., P.Ö.O., Ş.T., Analysis or Interpretation: G.K., P.Ö.O., Ş.T., D.A., Literature Search: G.K., P.Ö.O., Ş.T., D.A., Writing: G.K., P.Ö.O., Ş.T., D.A.

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## REFERENCES

1. Johns Hopkins University & Medicine. Coronavirus Resource Center. Available from: <https://coronavirus.jhu.edu/map.html>
2. Sanche S, Lin YT, Xu C, Romero-Severson E, Hengartner N, Ke R. High Contagiousness and rapid spread of severe acute respiratory syndrome coronavirus 2. *Emerg Infect Dis* 2020;26:1470-7.
3. Akarsu B, Canbay Özdemir D, Ayhan Baser D, Aksoy H, Fidancı İ, Cankurtaran M. While studies on COVID-19 vaccine is ongoing, the public's thoughts and attitudes to the future COVID-19 vaccine. *Int J Clin Pract* 2021;75:e13891.
4. Yalnız Z, Akgül Ö. Vaccine studies review for the Covid-19 outbreak. *Aydın Health Journal* 7;97-104.
5. COVID-19 vaccine. [https://tr.wikipedia.org/wiki/COVID-19\\_a%C5%9F%C4%B1s%C4%B1](https://tr.wikipedia.org/wiki/COVID-19_a%C5%9F%C4%B1s%C4%B1)
6. Our World in Data, Coronavirus (COVID-19) Vaccinations. Available from: [https://ourworldindata.org/covid-vaccinations?country=OWID\\_WRL](https://ourworldindata.org/covid-vaccinations?country=OWID_WRL)
7. Kwok KO, Li KK, Wei WI, Tang A, Wong S, Lee SS. Editörün Seçimi: hemşireler arasında grip aşısı alımı, COVID-19 aşılama niyeti ve aşı tereddütü: bir anket. *Uluslararası Hemşirelik Çalışmaları Dergisi* 2021;114:103854.
8. Omar DI, Hani BM. Attitudes and intentions towards COVID-19 vaccines and associated factors among Egyptian adults. *J Infect Public Health* 2021;14:1481-8.
9. Hemmer CJ, Löbermann M, Reisinger EC. COVID-19: epidemiology and mutations: an update. *Radiologie* 2021;61:880-7.
10. Majumder J, Minko T. Recent developments on therapeutic and diagnostic approaches for COVID-19. *AAPS J* 2021;23:14.
11. Kabamba Nzaji M, Kabamba Ngombe L, Ngoie Mwamba G, Banza Ndala DB, Mbidi Miema J, Luhata Lungoyo C, et al. Acceptability of Vaccination Against COVID-19 among healthcare workers in the Democratic Republic of the Congo. *Pragmat Obs Res* 2020;11:103-9.
12. Geniş B, Gürhan N, Koç M, Geniş Ç, Şirin B, Çırakoğlu OC, et al. Development of perception and attitude scales related with Covid-19 pandemia. *Pearson Journal of Social Sciences ve Humanities* 2020;5:306-26.
13. Türkiye Ölçme Araçları Dizini (TOAD). <https://toad.halileksi.net/olcek/covid-19-asisina-yonelik-tutumlar-olcegi>
14. World Health Organization. Health Topics. Vaccines and Immunization. Available from: [https://www.who.int/health-topics/vaccines-and-immunization#tab=tab\\_1](https://www.who.int/health-topics/vaccines-and-immunization#tab=tab_1)
15. Töreci K. History of vaccines. Badur, S. and Bakır, M., eds. *The Vaccine Book*. 1st edition. İstanbul: Akademi Publishing 2012;1-12.
16. Sanche S, Lin YT, Xu C, Romero-Severson E, Hengartner N, Ke R. High contagiousness and rapid spread of severe acute respiratory syndrome coronavirus 2. *Emerg Infect Dis* 2020;26:1470-7.
17. Agyekum MW, Afrifa-Anane GF, Kyei-Arthur F, Addo B. Acceptability of COVID-19 vaccination among health care workers in Ghana. *Advances in Public Health* 2021;2021:1-8.
18. Roy B, Kumar V, Venkatesh A. Health Care Workers' Reluctance to Take the Covid-19 Vaccine: A Consumer-Marketing Approach to Identifying and Overcoming Hesitancy. *NEJM Catalyst Innovations in Care Delivery* 2020;1:1-10.
19. Ocholla BA, Nyangena O, Murayi HK, Mwangi JW, Belle SK, Ondeko P, et al. Association of Demographic and Occupational Factors with SARS-CoV-2 Vaccine Uptake in Kenya. *Open Access Library Journal* 2021;8:1-8.
20. Çopur EÖ, Karasu F. Individuals' thoughts and attitudes about the COVID-19 vaccine. *Turkish Clinics Journal of Health Sciences* 2022;7:525-33.
21. Elmaoğlu E, Sungur M, Yavaş Çelik M, Öztürk Çopur E. The relationship between perception of Covid-19 control and attitudes towards Covid-19 vaccine in individuals. *J Soc Soc Work* 2021;32:337-53.
22. Yıldız Z, Gencer E, Gezegen NF. An applied study on the evaluation of individuals' attitudes towards vaccines developed during the Covid 19 pandemic process. *Gümüşhane University Institute of Social Sciences Electronic Journal* 2021;12:877-89.
23. Gan L, Chen Y, Hu P, Wu D, Zhu Y, Tan J. Willingness to Receive SARS-CoV-2 vaccination and associated factors among chinese adults: a cross-sectional survey. *Int J Environ Res Public Health* 2021;18:1993.
24. Guidry JPD, Laestadius LI, Vraga EK, Miller CA, Perrin PB, Burton CW, et al. Willingness to get the COVID-19 vaccine with and without emergency use authorization. *Am J Infect Control* 2021;49:137-42.