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The willingness to accept the COVID-19 vaccine and affecting factors among healthcare professionals: A cross-sectional study in Turkey

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Abstract

Introduction: While discussions on the effectiveness of COVID-19 vaccines continue, healthcare professionals' attitudes and their growing fear and anxiety during the pandemic process are not yet fully known. In this study, we aimed to investigate the COVID-19 vaccine acceptance and affecting factors in healthcare professionals.

Methods: This was a cross-sectional online survey conducted in 1574 healthcare professionals consisting of physicians, nurses, dentists, pharmacists, and healthcare personnel in Turkey in December 2020. Demographic, attitudinal, and Fear of COVID-19 Scale scores of healthcare professionals were investigated in this survey.

Results: About 84.6% of healthcare professionals declared willingness to accept the COVID-19 vaccine whenever possible. Most physicians (90.4%) stated to receive the COVID-19 vaccine, while 66.5% of nurses, 73.9% of healthcare personnel, also preferred to have it as soon as the vaccine was available. Factors affecting the willingness to accept the COVID-19 vaccine were found to be advanced age, male gender, working in a primary health care center, living with family, having a child, having a chronic disease, having high Fear of COVID-19 Scale (FC-19S) scores. While the group with the highest vaccine rejection rate was nurses with 33.5%, FC-19S scores were significantly higher in nurses who wanted to be vaccinated. In multivariate regression analyses, factors related to the acceptance of the COVID-19 vaccine were identified as advanced age, routine adult vaccination, no history of COVID-19, and recommendation of the COVID-19 vaccine.

Conclusion: A high proportion of healthcare professionals declared their willingness to accept the COVID-19 vaccine, and hence, this will play a leading role in optimizing the vaccination rate of the entire population while combating the pandemic.

What's known

- The COVID-19 vaccines developed are seen as the solution to control and terminate the pandemic.
- Healthcare professionals play a vital role in the general public's decisions to receive vaccinations.

- Factors related to the willingness to get the COVID-19 vaccine are not fully understood among healthcare professionals.
- Fear of COVID-19 levels shows variance among healthcare workers, which could contribute to vaccine acceptance.

What's new

- Healthcare professionals as role models for the public have shown a high willingness to get the COVID-19 vaccine.
- Elder age, male gender, high Fear of COVID-19 scores, working in high risk are strongly related to the willingness to COVID-19 vaccination.
- Physicians are the leading group with the highest COVID-19 vaccine acceptance among healthcare professionals, whereas nurses have relatively lower acceptance rates.
- Our findings among healthcare professionals show some similarities and differences with the current literature, and these findings will be of value to local and global strategy makers for fighting against the pandemic.

1 | INTRODUCTION

Although standard vaccine development is a long process, efforts have been made for a speedy organization of the available resources and knowledge from existing vaccines to fight this pandemic. For the vaccines to be effective in a pandemic, it is necessary to provide herd immunity and exceed the threshold rate by vaccinating many people. For this reason, many countries are working on developing effective strategies for the acceptability of vaccination, taking into account all the factors that determine the intention of vaccination.¹ However, many scientific studies indicate that healthcare professionals (HCPs) play a vital role in this issue and significantly affect the general public's decisions to receive the COVID-19 vaccine.^{2,3} Healthcare professionals have become a priority on vaccination programs as one out of every ten COVID-19 patients in Turkey was a healthcare professional, and a more significant proportion of HCPs have died of COVID-19 as a result of working in a very high-risk environment. Therefore, high levels of depression, anxiety, insomnia, and distress symptoms developed in HCPs during the COVID-19 pandemic associated with factors like working on the frontline and frequent testing for coronavirus.⁴ While discussions on the effectiveness of COVID-19 vaccines are continuing, the opinions of HCPs, and their increasing fear and anxiety during the pandemic process, are not yet fully known.⁵ In this study, we aimed to investigate the COVID-19 vaccine acceptance and affect healthcare professionals' factors.

2 | MATERIAL AND METHODS

The present study was a cross-sectional study based on data collected between 25 and 31 December 2020 among HCPs in Turkey through an online survey. The study population consisted of HCPs over the age of 18 inhabiting Turkey. Among the 1631 participants, 57 were excluded for being non-HCPs or from other countries,

and 1574 were included in the study. Online questionnaires were delivered through Google Forms by emailing and messaging on WhatsApp and Facebook and asking them to pass the questionnaire to other possible participants in their network. The first part of the questionnaire consisted of an explanatory part involving the study's information, then followed by an informed consent section before data collection. After completing the questionnaire, participants were asked to send the electronic questionnaire to other HCPs in their network using a simplified snowball sampling technique.

Sample size was calculated by OpenEpi, Version 3, open-source calculator with the formula as: "Sample size $n = [DEFF * Np (1-p)] / [(d^2 / Z_{1-\alpha/2}^2 * (N-1) + p * (1-p)]$." With a total population size of 1.033.767 (N) HCW across Turkey, a margin of error of 3%, a confidence interval of 95%, an assumption percentage of willingness to accept the COVID-19 vaccine (p) 50%, the minimum sample size was calculated as 1066 participants.

2.1 | The questionnaire

The survey was created through a literature review and included sociodemographic, COVID-19 attitudes and perceptions, and Fear of COVID-19 Scale (FC-19S) sections. Sociodemographic data were collected, including age, sex, marital status, occupation, employment place, place of work during the pandemic, household people, number of children, chronic diseases, smoking status, routine adult vaccinations, and any history of COVID-19. In the second part, questions assessed perceptions, including risks for COVID-19, barriers to vaccination, and attitudes toward COVID-19 vaccines. The third part of the questionnaire consisted of the FC-19S, a self-report scale with one dimension, and seven items assessing the COVID-19-related fear.⁶

This study was granted by Training and Research Hospital's Ethical Committee (IRB: 2020/13-70) and the Ministry of Health

Services General Directorate Scientific Research Platform (MoH: 2020-12-25T13_21_22).

2.2 | Statistical analyses

Data were analyzed by IBM SPSS Statistics version 21 (IBM, Armonk, NY, USA). A Chi-square test was used to compare categorical data. The distribution of the data was evaluated with the Kolmogorov-Smirnov test. Mann-Whitney *U* test and Kruskal Wallis test were used to compare data that did not show normal distribution. Logistic regression analysis was used to evaluate the factors affecting the willingness to get the COVID-19 vaccine. Enter method was used in univariate and multivariate logistic regression analysis. A *P* value of <.05 was considered to be statistically significant.

3 | RESULTS

A total of 1574 HCPs between 18 and 76 years of age participated in the study, with a mean age of 39.4 ± 10.8 years. Among the participants, 58.8% were females, 71.4% were married, 72.6% lived with their families, and 63.5% had children. Other characteristics included 30% had chronic diseases, 24% were smoking, 62.5% routinely had adult vaccinations, and 19.0% had a history of COVID-19. Workplace distribution showed that 66.8% were physicians, 32.3% worked in tertiary healthcare centers, and 58.5% worked in COVID-19 or related units (Table 1).

Of the 1574 participants, 84.6% of participants stated that they were willing to get the COVID-19 vaccine. Most physicians (90.4%) stated to receive the COVID-19 vaccine, while 66.5% of nurses, 73.9% of healthcare personnel, also preferred to have it as soon as the vaccine was available (Figure 1). The reasons for willingness for vaccination were "there is no treatment other than vaccination for COVID-19" (65.7%), and the reasons for not getting the COVID-19 vaccine were "lack of sufficient scientific literature" 51.9% ($n = 126$): 88.4% of participants were concerned about infecting themselves or their families. The source of information stated was 46.2% medical associations, 43.3% friends/colleagues, and 40.3% social media; 31.6% of the HCPs stated they would not get vaccinated if a specific drug was found for COVID-19. The majority, 91.3%, favored the COVID-19 vaccine to others, and 61.6% believed that the COVID-19 vaccine would end the pandemic (Table 2).

The vaccination site preference was 35.3% ($n = 432$) primary care, 29.2% ($n = 357$) university, and 20.4% ($n = 250$) hospitals. The FC-19S score received by those who were willing to get the COVID-19 vaccine was significantly higher, 19 ± 6.7 (Median = 18; min = 7- max = 35), than the score received by those who were not 17.7 ± 6.9 (Median = 17; min = 7- max = 35) ($P = .004$). FC-19S scores were significantly higher for nurses and dentists willing to accept the COVID-19 vaccine ($P = .014$ and $P = .002$ resp.) (Figure 2). Comparisons of factors affecting willingness to COVID-19 vaccine acceptance are given in Table 3.

TABLE 1 Sociodemographic characteristics of the HCPs ($N = 1574$)

Characteristics	n (%)
Age groups	
18-29 years	398 (25.3)
30-39 years	390 (24.8)
40-49 years	413 (26.2)
≥ 50 years	373 (23.7)
Sex	
Male	648 (41.2)
Female	926 (58.8)
Marital status	
Married	1124 (71.4)
Unmarried	450 (28.6)
Occupational status	
Physician	1051 (66.8)
Nurse	275 (17.5)
Health personnel	115 (7.3)
Pharmacist	70 (4.4)
Dentists	63 (4.0)
Employment status	
Primary healthcare center	359 (22.8)
Secondary healthcare center	457 (29.0)
Tertiary healthcare center	509 (32.3)
Private healthcare center	249 (15.8)
Workplace during the pandemic	
COVID-19 related units	271 (17.2)
Non-COVID-19 units	653 (41.5)
Both of them	650 (41.3)
Living together	
With family	1142 (72.6)
Alone	208 (13.2)
With parents	164 (10.4)
Others	60 (3.8)
Number of children	
0	575 (36.5)
1	414 (26.3)
≥ 2	585 (37.2)
Presence of chronic disease	
No	1102 (70.0)
Yes	472 (30.0)
Smoking status	
No	1189 (75.5)
Yes	385 (24.5)
Adult immunization practice in routine	
No	590 (37.5)
Yes	984 (62.5)
History of COVID-19 diagnosis	
No	1275 (81.0)
Yes	299 (19.0)

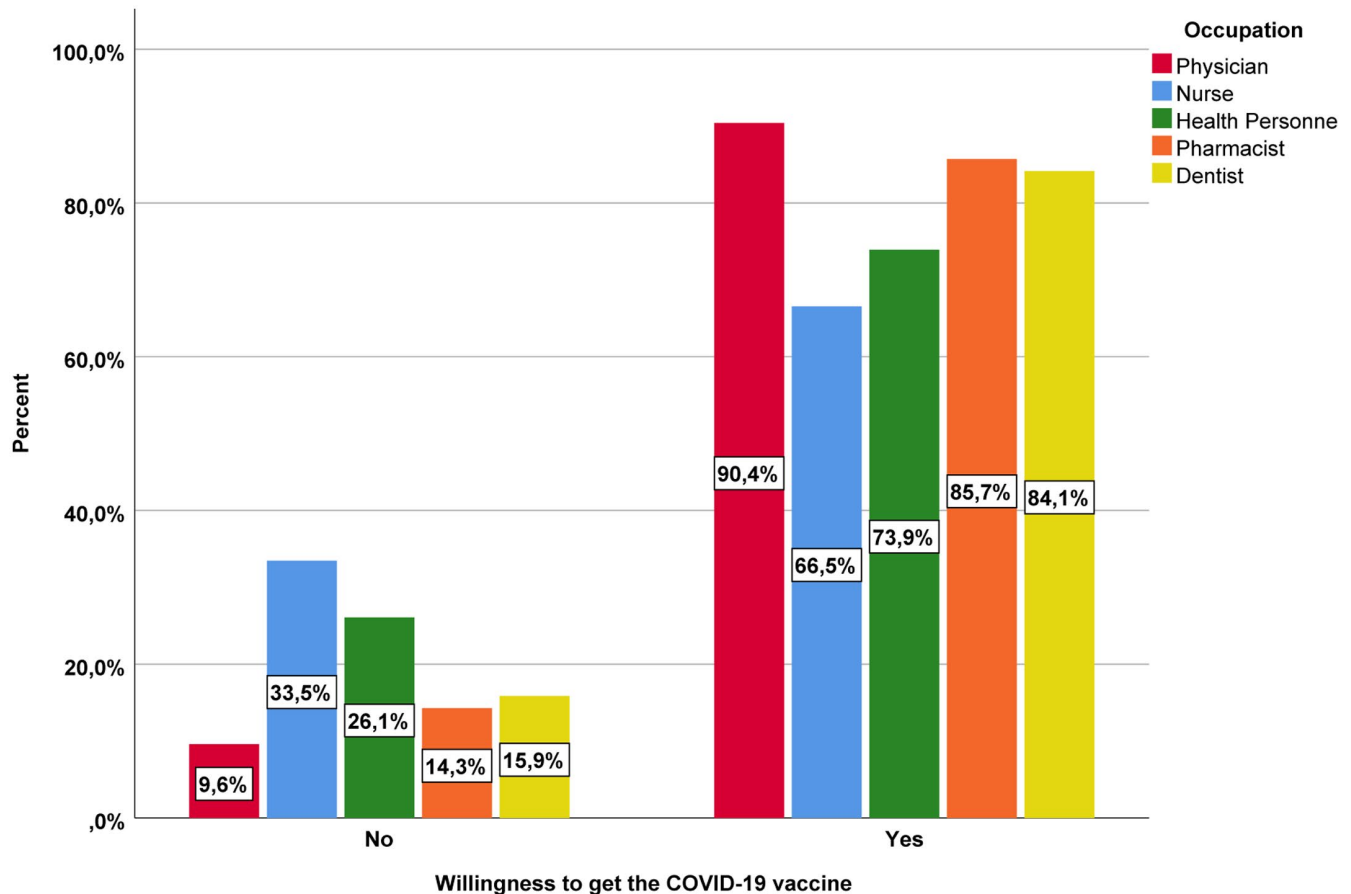


FIGURE 1 Rates of willingness to get the COVID-19 vaccine associated with the occupation

Depending on the multivariate logistic regression analyses, age groups between 40 and 49 years or over 50 years of age, routine uptake of adult vaccination, having a history of COVID-19, the choice of the vaccine instead of a possible COVID-19 drug, recommending other people for vaccination, and belief in the vaccine to end the pandemic were significantly related factors to a willingness for COVID-19 vaccination.

4 | DISCUSSION

In our study, we found the acceptance of the COVID-19 vaccine as 84.6% among HCPs. The most important factors that increased the willingness to get the COVID-19 vaccine were identified as advanced age, recommending the vaccine to others, having other routine adult vaccines, and believing in the COVID-19 vaccine to end the pandemic.

The rate of willingness among HCPs may differ from country to country. In one study, 77% of French healthcare workers reported that they wanted to get vaccinated for COVID-19⁷ while the willingness to get vaccinated was 28% among healthcare workers in Kongo.⁸ In a study on the potential acceptance of the COVID-19 vaccine in June 2020, among 13 426 people randomly selected from 19 countries, mainly with a high COVID-19 burden, 72% of the

participants reported they would accept vaccination if the vaccine proved safe and effective.⁹ As demonstrated by various studies, the context in which these studies are developed are highly dynamic and changing, with daily variations in perceived disease threat and COVID-19 vaccine development itself, and thus variances in results of surveys are seen at different periods.¹⁰ There are differences in the rates of intention to get COVID-19 vaccines, both among HCPs and throughout the community at large. This may be because of the rapid and changing flow of country-specific information regarding the disease or vaccines over time.

On the other hand, vaccine hesitancy seems to have an essential role in the emergence of these rates, whereas the rising rate of vaccine hesitancy among HCPs is also very bothersome. The rate of willingness to get the COVID-19 vaccine was higher for the elderly compared with younger people.^{7,10,11} However, some other studies do not show an increase in the rate of willingness for a vaccination with age.^{9,12} The willingness to be vaccinated was lower in women than in men.^{7,10-12} In a study conducted in seven countries throughout Europe, the willingness to get the COVID-19 vaccine was higher, especially in men over the age of 55.¹³ There is a positive relationship between male gender and acceptance of COVID-19 vaccination.¹⁴ Several independent reports indicate a higher risk of COVID-19 complications, infection, and death in men.¹⁵ While other gender-based health inequalities such as cardiovascular disease, chronic

TABLE 2 Perceptions and attitudes of the HCPs toward the COVID-19 vaccine (N = 1574)

Characteristics	Category	n (%)
Willingness to get the COVID-19 vaccine	No	243 (15.4)
	Yes	1331 (84.6)
Intention to get the COVID-19 vaccine other than provided by MoH	No	1012 (64.3)
	Yes	562 (35.7)
CoronaVac (China)	Yes	464 (29.5)
BioNTech (Germany)	Yes	846 (53.7)
Moderna (USA)	Yes	152 (9.7)
Oxford/Astra Zeneca	Yes	111 (7.1)
Domestic/Turkey	Yes	418 (26.6)
Concerns about COVID-19 disease for oneself or family	Strongly worried	650 (41.3)
	Worried	741 (47.1)
	Neither worried nor not	155 (9.8)
	No worry at all	28 (1.8)
Social media (Whatsapp, Facebook, Twitter, Instagram, etc)	Yes	635 (40.3)
Online newspapers	Yes	280 (17.8)
Online professional networks (Linkedin etc)	Yes	275 (17.5)
Television	Yes	401 (25.5)
Newspapers	Yes	85 (5.4)
Friends/colleagues	Yes	681 (43.3)
Scientific associations	Yes	727 (46.2)
Institutional briefings	Yes	412 (26.2)
MoH	Yes	537 (34.1)
Online medical publications (Pubmed, Medscape, UpToDate, etc)	Yes	557 (35.4)
Not getting sufficient information	Yes	48 (3.0)
The will for vaccination in case of availability of a specific drug for COVID-19	No	498 (31.6)
	Yes	1076 (68.4)
Recommending COVID-19 vaccine to others	No	137 (8.7)
	Yes	1437 (91.3)
The belief of COVID-19 vaccine to terminate pandemic	Strongly agree	240 (15.2)
	Agree	731 (46.4)
	No idea	297 (18.9)
	Disagree	274 (17.4)
	Strongly disagree	32 (2.0)
Time to end of the COVID-19 pandemic	<6 months	139 (8.8)
	6-12 months	476 (30.2)
	>12 months	838 (53.2)
	No idea	121 (7.7)

respiratory disease, and cancer are comprehensively reviewed,¹⁶ the high rate of male gender mortality in COVID-19 may result in a higher rate of vaccine acceptance in men.

HCPs taking care of COVID-19 positive patients, private sector nurses, individuals who perceived themselves at risk of illness, and those with chronic conditions were more likely to get the COVID-19 vaccine. In contrast to this, it has been shown in some studies that caregivers, nurses, and healthcare professionals not working with SARS-CoV-2 positive patients had higher vaccination hesitations.^{12,17} It should be considered that the willingness to be vaccinated does not depend solely on a single factor. It can be evaluated in terms of exposure to countries' social and cultural structures, messages conveyed by trusted physicians, family members, and relatives, and general or traditional social messages. The higher rate of willingness to get the COVID-19 vaccine in men can be attributed to differences in social, cultural, and traditional structures and men's tendency to take risks.¹⁸ Willingness to accept COVID-19 vaccination has been positively associated with the perception that COVID-19 will persist over time but negatively correlated with the media's perception by overestimating the risks of vaccination, thus reducing the willingness to be vaccinated.¹⁹ The fact that elder age and COVID-19 deaths were frequently associated with each other in the media and scientific publications, this resulted in more intense restrictions on the elderly, which consequently increased the perception of the elderly being in the highest COVID-19 risk group.

Being married was significantly associated with willingness to accept COVID-19 vaccination. Almost half of the caregivers in one study reported that they were willing to get a new COVID-19 vaccine even it was approved with less rigorous testing and research.²⁰ In our study, being married, having children, and living with the family were the independent factors associated with the willingness to be vaccinated. It can be thought that people who are married, live with their family, and have children exhibit behaviors of protecting their families from COVID-19, and as a result, their willingness to be vaccinated may have increased. In line with this, one study found that the main reason for willingness to be vaccinated for COVID-19 was "protecting themselves and their family." Also, fear of COVID-19 and self-perceived risk of infection were associated with the willingness to get the COVID-19 vaccine in HCPs.⁷

As frequently mentioned in media and scientific papers, smoking is considered a high-risk criterion for COVID-19. It would be expected to cause fear of getting the disease and create a higher willingness for vaccine acceptance. Contrary to this view, a social study with 29,148 people found that smokers were generally distrustful of vaccines' benefits and unwilling or hesitant to get the COVID-19 vaccine compared with non-smokers. It has been stated that this may be related to various other factors such as being unmarried and young to a higher percentage among the smoker group.²¹ This is also parallel to our work.

A study conducted in 2046 HCPs in France showed that those who had a previous influenza vaccine were associated with a higher rate of COVID-19 vaccine acceptance. Similarly, this relationship between the willingness to get COVID-19 vaccination and influenza

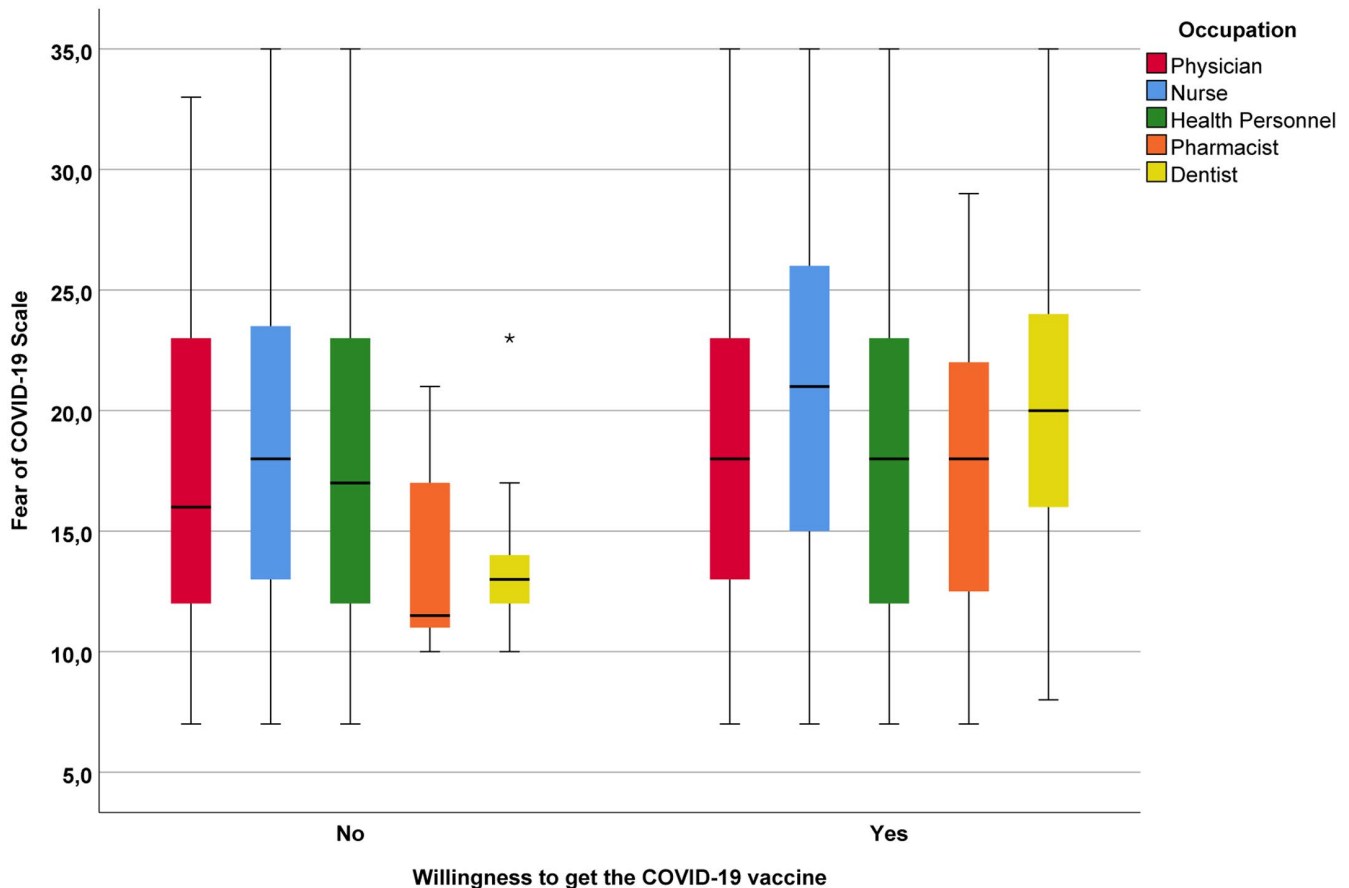


FIGURE 2 Comparison of fear of COVID-19 scale scores by occupation and the willingness to get the COVID-19 vaccine

vaccination had also been demonstrated in a study previously conducted with 806 nurses in Hong Kong.¹⁷ In parallel, it has been shown that influenza vaccine refusal is caused by the hesitancy of HCPs to be vaccinated in general, as a result of side effects, vaccine ineffectiveness, and misinformation or insufficient knowledge that the vaccine causes disease.²² For this reason, it is thought that the healthcare workers in the group in our study who had regular adult vaccines, believed in the effectiveness and protection of the vaccines and perceived that the COVID-19 vaccine was an effective solution. Effective vaccination in the course of a pandemic is crucial for reaching the vaccination level that could create herd immunity.²³ Although this rate is 80% for polio, it is not yet known for COVID-19.²⁴ In a modeling study for the American population, the herd immunity rate required for COVID-19 eradication in the United States was reported to be at least 82.5%, with a COVID-19 vaccine at 80% effectiveness. The study showed that the herd immunity threshold could decrease to 46% if everyone regularly wore face masks in public.²⁵ The high rate of healthcare professionals recommending the COVID-19 vaccine in our study is also a promising finding.

Vaccine hesitations and refusals can be significant barriers to vaccine intake, especially for new pandemic vaccines. Studies showed that physicians are highly effective in encouraging vaccination and are likely to have a similar role in the COVID-19 vaccine.

However, physicians will need comprehensive and up-to-date information on COVID-19 vaccines, and pre-vaccination planning is required to equip them with the knowledge and skills to counteract anti-vaccination messages in the media.²⁶ In our study, considering Coronovac, BioNTech, and domestic vaccines' availability as more likely, healthcare professionals may have a higher desire to be vaccinated with these vaccines. Publications about the effects or side effects of different vaccines in different countries will cause these views to change.

Patients, healthcare colleagues, family, friends, and others will seek doctors' advice about whether to be vaccinated. Physicians will need to discuss the benefits and risks to alleviate their hesitation about getting the vaccine.²⁷ Reliable and culturally informed health communication is vital in influencing positive health behaviors.²⁸ The main concern can be considered that vaccines, which can typically be developed in 10-15 years, are prepared in as little as one year, bringing safety concerns.²⁹ Reasons for refusal and hesitation for COVID-19 vaccination included "doubts about effectiveness, efficacy, and safety," "believing it is unnecessary," and "no time to take it."¹⁷ Concerns about side effects were a significant cause of vaccine hesitations.^{11,14,30} Knowledge about the vaccine's safety and efficacy will be crucial to ensuring public confidence in vaccination and facilitating acceptance. In our study, the participants preferred the Family Health Centers as the primary place of vaccination. There

TABLE 3 Comparison of HCPs' characteristics with the willingness to get the COVID-19 vaccine

Characteristics	Category	Willingness to get COVID-19 vaccine		
		No N (%)	Yes N (%)	P value
Age groups	18-29 years	112 (28.1)	286 (71.9)	<.001
	30-39 years	64 (16.4)	326 (83.6)	
	40-49 years	48 (11.6)	365 (88.4)	
	≥50 years	19 (5.1)	354 (94.9)	
Sex	Male	85 (13.1)	563 (86.9)	.033
	Female	158 (17.1)	768 (82.9)	
Marital status	Married	152 (13.5)	972 (86.5)	.001
	Unmarried	91 (20.2)	359 (79.8)	
Occupational status	Physician	102 151 (9.6)	950 (90.4)	<.001
	Nurse	92 (33.5)	183 (66.5)	
	Health personnel	30 (26.1)	85 (73.9)	
	Pharmacist	10 (14.3)	60 (85.7)	
	Dentists	10 (15.9)	53 (84.1)	
Employment status	Primary healthcare center	38 (10.6)	321 (89.4)	<.001
	Secondary healthcare center	76 (16.6)	381 (83.4)	
	Tertiary healthcare center	105 (20.6)	404 (79.4)	
	Private healthcare center	24 (9.6)	225 (90.4)	
Workplace during pandemic	COVID-19 related units	51 (18.8)	220 (81.2)	.151
	Non-COVID-19 units	90 (13.8)	563 (86.2)	
	Both of them	102 (15.7)	548 (84.3)	
Living together	with family	149 (13)	993 (87)	<.001
	Alone	36 (17.3)	172 (82.7)	
	with parents	41 (25.0)	123 (75.0)	
	Others	17 (28.3)	43 (71.7)	
Number of children	0	124 (21.6)	451 (78.4)	<.001
	1	51 (12.3)	363 (87.7)	
	≥2	68 (11.6)	517 (88.4)	
Presence of chronic disease	No	192 (17.4)	910 (82.6)	.001
	Yes	51 (10.8)	421 (89.2)	
Smoking status	No	182 (15.3)	1007 (84.7)	.800
	Yes	61 (15.8)	324 (84.2)	
Adult immunization practice in routine	No	122 (20.7)	468 (79.3)	<.001
	Yes	121 (12.3)	863 (87.7)	
History of COVID-19 diagnosis	No	158 (12.4)	1117 (87.6)	<.001
	Yes	85 (28.4)	214 (71.6)	
Intention to receive a COVID-19 vaccine other than provided by MoH	No	191 (18.9)	821 (81.1)	<.001
	Yes	52 (9.3)	510 (90.7)	
CoronaVac (China)	No	213 (19.2)	897 (80.8)	<.001
	Yes	30 (6.5)	434 (93.5)	
BioNTech (Germany)	No	145 (19.9)	583 (80.1)	<.001
	Yes	98 (11.6)	748 (88.4)	
Moderna (USA)	No	225 (15.8)	1197 (84.2)	.197
	Yes	18 (11.8)	134 (88.2)	

(Continues)

TABLE 3 (Continued)

Characteristics	Category	Willingness to get COVID-19 vaccine		
		No N (%)	Yes N (%)	P value
Oxford/Astra Zeneca	No	224 (15.3)	1239 (84.7)	.612
	Yes	19 (17.1)	92 (82.9)	
Domestic/Turkey	No	151 (13.1)	1005 (86.9)	<.001
	Yes	92 (22.0)	326 (78.0)	
Concerns about COVID-19 disease for ownself or family	Strongly worried	95 (14.6)	555 (85.4)	<.001
	Worried	87 (11.7)	654 (88.3)	
	Neither worried nor not.	48 (31.0)	107 (69.0)	
	Not worried at all	13 (46.4)	15 (53.6)	
Social media (Whatsapp, Facebook, Twitter, Instagram. etc)	No	138 (14.7)	801 (85.3)	.322
	Yes	105 (16.5)	530 (83.5)	
Online newspapers	No	191 (14.8)	1103 (85.2)	.110
	Yes	52 (18.6)	228 (81.4)	
Online professional networks (Linkedin etc)	No	195 (15.0)	1104 (85.0)	.308
	Yes	48 (17.5)	227 (82.5)	
Television	No	177 (15.1)	996 (84.9)	.512
	Yes	66 (16.5)	335 (83.5)	
Newspapers	No	229 (15.4)	1260 (84.6)	.787
	Yes	14 (16.5)	71 (83.5)	
Friends/colleagues	No	137 (15.3)	756 (84.7)	.903
	Yes	106 (15.6)	575 (84.4)	
Scientific associations	No	174 (20.5)	673 (79.5)	<.001
	Yes	69 (9.5)	658 (90.5)	
Institutional briefings	No	194 (16.7)	968 (83.3)	.020
	Yes	49 (11.9)	363 (88.1)	
MoH	No	170 (16.4)	867 (83.6)	.145
	Yes	73 (13.6)	464 (86.4)	
Online medical publications (Pubmed, Medscape, UpToDate. etc)	No	182 (17.9)	835 (82.1)	<.001
	Yes	61 (11.0)	496 (89.0)	
Not getting sufficient information	No	234 (15.3)	1292 (84.7)	.519
	Yes	9 (18.8)	39 (81.3)	
The will for vaccination in case of availability of a specific drug for COVID-19	No	187 (37.6)	311 (62.4)	<.001
	Yes	56 (5.2)	1020 (94.8)	
Recommending COVID-19 vaccine to others	No	82 (59.9)	55 (40.1)	<.001
	Yes	161 (11.2)	1276 (88.8)	
The belief of COVID-19 vaccine to terminate pandemic	Strongly agree	17 (7.1)	223 (92.9)	<.001
	Agree	59 (8.1)	672 (91.9)	
	No idea	71 (23.9)	226 (76.1)	
	Disagree	78 (28.5)	196 (71.5)	
	Strongly disagree	18 (56.3)	14 (43.8)	
Time to end of COVID-19 pandemic	<6 months	22 (15.8)	117 (84.2)	<.001
	6-12 months	52 (10.9)	424 (89.1)	
	>12 months	127 (15.2)	711 (84.8)	
	I have no idea	42 (34.7)	79 (65.3)	

Bbold are less than .05 and significant.

is no doubt that family medicine units that have served many years in primary care for children and adult vaccinations would be the most trusted units for COVID-19 vaccinations. Therefore, it seems inevitable that these units, which can also serve as trainers in the war with the pandemic, have an important place.³¹ The widespread circulation of misleading and false information about vaccines, conspiracy theories, especially on social media, is known as some of the critical factors associated with vaccine refusal.^{32,33} After the pandemic was declared, the lack of sufficient information about COVID-19 and the Internet's dominance in numerous fake news seems to have led physicians to get information from accurate and reliable sources.

In a study involving healthcare professionals, 80% of information on COVID-19 was reached online. The self-confidence of healthcare workers, whose source of information is academic courses, was higher. No difference was seen in other sources of information.³⁴ It has been shown that the information on the websites of official public health organizations is more reliable.³⁵ It has been determined that it is more appropriate for official institutions to provide information not alone but in cooperation with other organizations and media.³⁶

In previous studies, physicians' importance as a stakeholder for the success of herd immunity was observed and positively affected society's acceptance of vaccines.^{3,37} However, family physicians and primary healthcare workers, who will take on an educative role in the fight against the pandemic, were more willing to be vaccinated significantly than those working at other levels.³¹ We also found in our study that the main reason for HCPs' unwillingness to be vaccinated was "lack of sufficient studies." This suggests that effective communication of scientific studies on COVID-19 and scientific information on vaccines to HCPs will help overcome doubt or resistance to vaccination.^{14,22} Physicians were significantly higher in recommending the COVID-19 vaccine than nurses and other occupational groups. These findings are also in line with the studies conducted after the H1N1 epidemic. In a study regarding the H1N1 pandemic, it was observed that although nurses had an intense relationship with patients and had a relatively higher risk, they were more reluctant to be vaccinated, which was because of misinformation about vaccines or ignoring the risk.³⁸ Similarly, there is a need to increase nurses' awareness of this issue in our study.

However, our study has some limitations. At first, this study was done before phase 3 results of the approved COVID-19 vaccine were announced, and respondents answered with their self-reports. Secondly, long-time follow-up is needed to evaluate individuals' vaccination rates over time by studies with a larger sample size obtained via scanning of records.

5 | CONCLUSION

These results confirm that most of our HCPs in Turkey have a high rate of willingness to accept the COVID-19 vaccine and HCPs are anticipated to positively influence the public's attitude and perceptions toward the COVID-19 vaccine. Unlike other diseases, higher fear levels are associated with the higher willingness to get the COVID-19

vaccine during this pandemic. Considering the educative role of healthcare professionals among the society on vaccine acceptance, we should understand and prioritize such concerns and factors that can result in the COVID-19 vaccine acceptance. Therefore, healthcare professionals must continue their leading and educative roles in combating the pandemic, as the most reliable resources to optimize vaccination across the community.

ETHICS APPROVAL

This study was granted by Training and Research Hospital's Ethical Committee (IRB: 2020/13-70) and Ministry Health Services General Directorate Scientific Research Platform (MoH: 2020-12-25T13_21_22).

CONSENT TO PARTICIPATE

The corresponding author signs this Authorship & Conflicts of Interest Statement on behalf of all the listed authors in the manuscript. The corresponding author certifies that all the information contained in this statement is accurate, correct, and agreed on by all the listed authors:

DISCLOSURES

All authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript.

AUTHOR CONTRIBUTIONS

All authors contributed to the study conception and design. All authors read and approved the final manuscript. Askin Keskin Kaplan: conception, acquisition, literature review, Drafting, revising it critically, analysis interpretation of data, Final approval of the version to be published. Mustafa Kursat Sahin: conception, design of the work; analysis interpretation of data. Hulya Parildar: drafting, conception, design of the work, Final approval of the version to be published. Isil Adadan Guvenc: conception, design of the work, literature review.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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