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RESEARCH ARTICLE

ATTITUDE TOWARDS COVID-19 VACCINE AND AFFECTING FACTORS IN ADULTS FROM TURKEY

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ABSTRACT

Objective: This study aims to examine the attitude towards COVID-19 Vaccine and its affecting factors in adults from Turkey.

Materials and Methods: This descriptive study was conducted in February 2021 with a total of 645 adult individuals. The Introductory Information Form, The Scale of Vaccine Hesitancy, and The Attitudes Towards the COVID-19 Vaccine Scale were used to collect the research data. The data were collected online via the snowball sampling method through social media.

Results: In the study, 33.8% of the participants stated that they will not get vaccinated for Coronavirus. The concerns of the participants about getting the COVID-19 vaccine were, the fact that the vaccine was produced in a very short time (19.8%), fear of the side effects of the vaccine (18.9%), and not finding the contents of vaccines safe (16.2%).

Conclusions: The factors affecting the positive attitude towards the COVID-19 vaccine are, in turn, thinking about getting COVID-19 Vaccine, finding it useful to wear a mask, thinking that the source of COVID-19 is natural, being a healthcare professional and not refusing the vaccine in the past.

Keywords: Vaccination Refusal, COVID-19 Vaccines, Anti-Vaccination Movement, Turkey

INTRODUCTION

The COVID-19 pandemic has severely damaged the health and economy of many countries, and its negative impact on the world continues to increase. Vaccination is known to be the most effective way to control or eradicate infectious diseases (1,2). However, for the vaccine to be effective, it must be accepted and used by the majority of the population (3). In 2014, the World Health Organization (WHO) Strategic Advisory Group of Vaccination Experts defined vaccine hesitation as "a delay in accepting or refusing vaccination despite the availability of vaccination services" (4). Vaccine hesitancy varies depending on when, where, and which vaccine is in

question. According to a recent study conducted in Turkey and the United Kingdom, it was revealed that approximately one in three (31%) people in Turkey and one in seven (14%) in the United Kingdom are hesitant about the COVID-19 vaccine (5). In a study conducted in the United States, approximately 68% of those participating in the study supported vaccination for COVID-19, however; participants reported concerns about side effects, efficacy, and test time (3). In another study conducted in Turkey, 49.7% of respondents have reported that they would vaccinate against COVID-19 if a vaccine is developed for COVID-19 infection (2).

In a study conducted in the United Kingdom; researchers found that 14% of participants did not want to get a vaccine for COVID-19, and 23% were not sure. They found that 16% of survey respondents displayed a high level of mistrust about vaccines in one or more areas (6). Studies have reported that insecure attitudes towards vaccination are higher in individuals with ethnic minority backgrounds, those with low education, lower annual income, and insufficient knowledge of COVID-19. Meanwhile, attitudinal and behavioral barriers in front of hesitation to get COVID-19 vaccine have been cited as; not having a flu vaccine in past years, insufficient adherence to COVID-19 government guidelines, concerns about the future impacts of vaccines, and general distrust about the benefits and safety of vaccines, and distrust of the government and others (6–8). Negative attitudes towards vaccines and uncertainty or unwillingness to be vaccinated are seen as major obstacles to managing the COVID-19 pandemic in the long term (6).

Considering that the COVID-19 vaccine has recently been applied to certain groups in our country, it is an urgent and important issue to examine the attitudes towards the COVID-19 vaccine and the factors that cause vaccine hesitation. In addition, it is considered that vaccine hesitation is likely to play a major role in attitudes towards the COVID-19 vaccine (9), as vaccine hesitation has increased in more than 90% of countries (10) and the WHO identified vaccine hesitation as one of the top ten global health threats in 2019 (11). The purpose of this study is to examine the attitude towards COVID-19 Vaccine and its affecting factors in adults from Turkey.

Research Questions

1- What is the distribution of the descriptive characteristics of the participants?
2- What is the frequency of the participants' reasons for vaccine refusal and hesitation?
3- What are the factors affecting the vaccine hesitations and positive attitudes of the participants towards the COVID 19 vaccine?

MATERIALS AND METHODS

Type of Research

This study was designed as a descriptive research.

Population and Sample of the Research

The universe of the study consisted of 56,592,570 adults living in Turkey. While calculating the research sample, the vaccine acceptance rate was accepted as 50% and the margin of error was 4% (95% CI: 54% 46-%), and the sample was calculated as 601 people. The written voluntary consent of the participants was obtained before collecting the data and 645 participants over the age of 18, who were literate and agreed to participate in the study were included to the sample group.

Data Collection

The Introductory Characteristics Form, Scale of Vaccine Hesitancy, and The Attitudes Towards the COVID-19 Vaccine Scale were used to collect the research data. The data were collected online with the e-questionnaire form via social media accounts by the snowballing method.

The Introductory Characteristics Form: This form was developed in line with the literature and consists of 19 questions about sociodemographic information, concerns about the vaccine, and the causes of hesitation and refusal of the vaccine.

The Scale of Vaccine Hesitancy: This scale was developed by Kılıçarslan et al. in 2020, and its validity and reliability study was conducted by them (12). The scale is a 5-point Likert type, and the lowest score that can be obtained from the scale is 12 and the highest score is 60 points. The scale has no cut-off value, an increase in the total score is interpreted as an increase in vaccine hesitancy or hesitation. They found the Cronbach's alpha reliability coefficient of the scale to be 0.90 (12). In this study, the Cronbach's alpha value of the scale was found 0.87.

The Attitudes Towards The COVID-19 Vaccine Scale: This scale was developed by Geniş et al. in 2020, and its validity and reliability study was

conducted by them (13). Attitudes towards The COVID-19 Vaccine Scale is a 5-point Likert type and consists of 9 items. The scale has two sub-dimensions: positive and negative attitude. High scores from the positive attitude sub-dimension indicate that the attitude towards vaccination is positive. The high scores in the negative attitude sub-dimension indicate that the negative attitude towards the vaccine is less. They found the Cronbach's alpha reliability coefficient 0.80 (13). In this study, the Cronbach's alpha value of the scale was found 0.90.

Evaluation of Data

After the data were collected, they were transferred to the IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp package program and Kolmogorov Smirnov test was applied for the normality analysis of the data. Cronbach's Alpha value was calculated to measure the reliability of The Scale of Vaccine Hesitancy and The Attitudes Towards COVID-19 Vaccine Scale. The frequency and percentage distributions of the answers given to the questionnaire prepared by the researchers were presented. Mann-Whitney U test was used to compare variables with two groups, and the Kruskal Wallis test was used for comparing more than two groups. Bonferonni correction was applied in paired comparisons to find the source of the difference in variables with more than two categories. We created multiple linear regression models to find out which variables affect the refusal of vaccine and COVID-19 vaccine acceptance. The research was evaluated statistically at a 95% confidence interval.

Ethical Approval

Data was collected in February 2021, ethical approval was obtained from the Non-Interventional Clinical Research Ethics Committee of Üsküdar University (61351342 / January 2021-09). Participants were informed about the research and the voluntary consent of the participants was obtained. Permission to use the scale was obtained from the scale developers via e-mail.

RESULTS

The average age of the participants in the study was found to be 28.38 ± 8.96. 73.8% of the participants were women, 64% were university graduates, 21.9% were healthcare workers, 22.3% of their income was less than their expenses, the family type in the house where 74.3% lived was the nuclear family. 73.3% of the participants stated that they did not have a flu vaccine in the past and 11.8% refused a vaccine recommended in the past. 57.7% of participants were a little worried about getting COVID-19 infection, 66.2% were considering getting COVID-19 vaccine, 33.4% of the participants prefer the German (BionTech) vaccine, and 29.1% were vaccinated. 94.6% found it useful to wear a mask, 15.5% of the participants did not receive health services because they did not trust the health system, 60.2% rely on expert knowledge on health-related issues, and 63% of the participants think the source of COVID-19 is artificial. In the study, it was found that 262 (19.8%) participants had concerns about the vaccine because the COVID-19 vaccine was produced in a very short time (Table 1).

In the study, 373 of the participants (57.8%) were afraid of the side effects of the vaccine, 301 (46.7%) were not sure about the benefit and safety of the vaccine, and 238 (36.9) were preferring other forms of protection and for these reasons, it was found that they were hesitant about the vaccine and refused it (Table 2).

In the study, the mean total score of The Scale of Vaccine Hesitancy was found to be statistically and significantly higher in those who rejected a vaccine recommended in the past ($p<0.001$), did not think to have a COVID-19 vaccine ($p<0.001$), did not find it useful ($p<0.001$), and did not trust the modern health system ($p<0.001$), in those who do not rely on expert knowledge on health-related issues ($p<0.001$) and those who think the COVID-19 virus is artificial ($p<0.001$). The total average score of The Scale of Vaccine Hesitancy was found to be low in those who have postgraduate education level ($p<0.001$), are health workers ($p<0.001$), think to have their child vaccinated ($p<0.001$), in those prefer any vaccine even if they have a choice ($p<0.001$), and respondents who encountered the most anti-vaccine content on Facebook ($p<0.001$). The difference was statistically significant. Participants with low socioeconomic status ($p<0.001$) and living in extended families ($p<0.001$) had statistically significantly higher anti-vaccine scores. There is no statistically significant difference between the total mean score of The Scale of Vaccine Hesitancy and the gender ($p= 0.925$), marital status ($p= 0.846$), place of residence ($p= 0.634$), presence of disease ($p= 0.238$), past flu vaccine intake ($p= 0.081$), having

Table 1. Descriptive statistics of the participants

Descriptive Characteristics	n	%	Descriptive Characteristics	n	%
Age (year)			***Smoking status***		
15-30	384	32.4	Yes	359	30.3
31-45	536	45.2	No, I left before	221	18.6
≥ 45	265	22.4	No, I never used	571	48.2
Gender			I stopped using it during the pandemic process	34	2.9
Female	777	65.6	***Alcohol use status***		
Male	408	34.4	Yes	290	24.5
Education			No, I left before	137	11.6
Primary school	18	1.5	No, I never used	709	59.8
Secondary school	121	10.2	I stopped using it during the pandemic process	49	4.1
Associate Degree	106	8.9	***Presence of other chronic disease***		
License	685	57.8	Yes	233	19.7
Master-Doctorate	255	21.5	No	952	80.3
Working status			***Total***	**1185**	**100**
Working	855	72.2	***Other chronic diseases***		
Not working	271	22.9	Asthma-Bronchitis-COPD	56	24.0
Retired	59	5.0	Cardiovascular Syst. Diseases	35	15.0
Income			Hypertension	41	17.6
4.000 TL	427	36.1	Diabetes mellitus	38	16.4
4.000-8.000 TL	565	47.6	Thyroid Diseases	28	12.0
≥ 8.000 TL	193	16.3	Other	35	15.0
Total	**1185**	**100**	***Total***	**233**	**100**

***TL: Turkish Lira**

the COVID-19 infection (p= 0.303) and concern about getting COVID-19 infection (p= 0.093).

In the study, the average score of Positive Attitude towards COVID-19 Vaccine was found to be statistically significantly higher in those who had a flu vaccine in the past (p= 0.009), those who did not refuse a recommended vaccine in the past (p<0.001), those who think to have a COVID-19 vaccine (p<0.001), those who find it useful to wear a mask (p<0.001), those who trust the modern health system (p<0.001) and those who think the COVID-19 virus is natural (p<0.001).

The average score of positive attitude towards COVID-19 vaccine was found to be low in participants who do not worry about getting COVID-19 infection (p<0.001), do not intend to vaccinate their child (p<0.001), and would not prefer any vaccine if they had a choice (p<0.001), the difference was statistically significant. The positive attitude towards COVID-19 Vaccine score of the participants who were healthcare workers (p<0.001) and who encountered anti-vaccine content on Facebook most (p<0.001) was found to be statistically and significantly higher.

There is no statistically significant difference between the positive attitude towards COVID-19 vaccine mean score and gender (p= 0.889), marital status (p= 0.821), place of residence (p= 0.409), presence of disease (p= 0.247), being infected with COVID-19 (p= 0.245), relying on expert knowledge on health issues (p= 0.420), educational status (p= 0.146), economic status (p= 0.187) and the number of people living in the house (p= 0.561).

In the study, negative attitude towards COVID-19 Vaccine was found to be statistically and significantly higher in those who have rejected a vaccine recommended in the past (p<0.001), those who are not considering to have a COVID-19 vaccine (p<0.001), those who do not find it useful to wear a mask (p<0.001), those who do not trust the modern health system (p<0.001) and those who think the COVID-19 virus is artificial (p<0.001).

The negative attitudes towards COVID-19 vaccine scale was found to be high in participants with low socioeconomic level (p<0.001), living with extended family (p= 0.002), not worried about getting COVID-

Table 2. Participants' experiences with healthcare services during the pandemic process

Expressions	n	%
Did you or any of your family members need healthcare during the pandemic process?		
No, I didn't need	725	61.2
Yes, just 1 time	256	21.6
Yes, 1-3 times	175	14.8
Yes, more than 3 times	29	2.4
Total	**1185**	**100**
What kind of healthcare service did you use for your healthcare needs?		
I needed to use healthcare services, but I didn't apply to the hospital because of the pandemic measures, I used the facilities at home.	223	48.4
Emergency health services	40	8.7
Public hospital (outpatient)	90	19.6
Private hospital (outpatient)	91	19.8
Public + Private hospital (inpatient treatment)	16	3.5
Total	**460**	**100**
During the pandemic process, did you have any problem in accessing medicine-medical supplies?		
No, I didn't have any problems.	951	80.3
As part of the measures taken, I could not go out to get my medicine.	30	2.5
I could not take my medicine because there is no pharmacy near me	3	0.3
I could not find my medicine in the pharmacy.	18	1.5
Missing	183	15.4
Total	**1185**	**100**
Do you think you fully comply with the measures taken during the coronavirus process (curfew, use of masks, social distance, hand washing, etc.)?		
Yes	998	84.2
Partially	173	14.6
No	14	1.2
Total	**1185**	**100**

19 infection (p= 0.028), not considering vaccination for their child (p<0.001), and would not prefer any vaccine if they had a choice (p<0.001) and the difference was statistically significant.

Participants with postgraduate education level (p= 0.026), healthcare workers (p= 0.004), and most frequently encountered anti-vaccine content on Facebook (p<0.001) had statistically and significantly lower negative attitudes towards COVID-19 vaccine.

There was no statistically significant difference between the mean score of negative attitude towards COVID-19 vaccine and gender (p= 0.148), marital status (p= 0.441), place of residence (p= 0.221), presence of disease (p= 0.509), past flu vaccine intake (p= 0.430), have had the COVID-19 infection (p= 0.485) and reliance on expert knowledge on health issues (p= 0.107).

As a result of the difference analysis made, 3 multiple linear regressions were carried out to investigate determinants of anti-vaccination, positive and negative attitude towards the COVID-19 vaccine (Table 3).

The first model created to determine the predictors that affect anti-vaccination explains 51% of the variance (F:52,876, p<0,01, R2:0,507). Accordingly, when the predictors that affect vaccine rejection are examined, the rate of influence is from high to low, respectively, not thinking about getting COVID-19 vaccine, not finding it useful to wear a mask, thinking that the source of COVID-19 is artificial, not wanting to vaccinate your child, not trusting the modern health system, not being a health worker, having an extended family, being young, having less income than expenses and having an education below undergraduate level.

The second model for predicting factors affecting positive attitudes towards the COVID-19 vaccine explained 43% of the variance (F:38,514, p<0,01, R^2:0,429). The factors affecting the positive attitude towards the COVID-19 vaccine are, in turn, thinking about getting COVID-19 Vaccine, finding it useful to wear a mask, thinking that the source of COVID-19 is natural, being a healthcare professional and not refusing the vaccine in the past.

Table 3. The evaluations of the participants regarding the health services they received/will receive in the event that they were diagnosed with coronavirus or assumed they were diagnosed with coronavirus.

Expressions		Disagree	Undecided	Agree
		%	%	%
1.	I had full confidence that the diagnostic test applied to me in the health facility gave accurate results and that the diagnosis was correct.	20.4	18.9	60.7
2.	I was confident that the necessary quarantine processes and processes would be initiated immediately after the diagnosis was made.	18.7	11.8	69.5
3.	I have full confidence that the highest quality treatment and health care will be provided by timely intervention in the health institution.	18.9	16.6	64.5
4.	I have full confidence that the healthcare professionals will make the right decisions about my treatment, do whatever it takes to provide the medical care I need, and provide the most appropriate treatment.	17.0	12.5	70.5
5.	In this process, I have full confidence that our healthcare system will keep my health and the necessary treatment superior to everything, including treatment costs.	19.6	16.1	64.3
6.	I have full confidence that all the precautions have been taken regarding the processes of keeping the medicines or medical supplies related to my treatment by hospitals or personally procuring them from pharmacies.	20.8	17.2	62.0
7.	I had full confidence that the follow-up, diagnosis and treatment of my family or people around me who might have infected this disease would be done properly.	20.3	15.6	64.1
8.	After I was diagnosed with coronavirus, I was completely confident that the treatments given by health institutions and specialists would have positive results and I would be completely cured.	19.6	19.6	60.8

The third model created to determine predictors that affect negative attitudes towards the COVID-19 vaccine explains 39% of the variance (F: 32,559, p<0,01, R^2:0,385). Factors affecting the negative attitude towards the COVID-19 vaccine are to consider taking the COVID-19 vaccine, finding it useful to wear a mask, increasing age, not living in a large family, thinking that the source of COVID-19 is natural and trusting the modern health system.

DISCUSSION

The COVID-19 pandemic turned into a pandemic in 2020 after the WHO declares vaccine rejection as one of the biggest global threats in 2019. Although it causes serious shutdowns and damages all over the world, it is seen in studies that vaccine acceptance is still not sufficient. In this study we conducted, vaccine acceptance was found as 66.2%. This rate was determined as 65% in Ireland, 69% in the United Kingdom, 67% in the United States, 78% in France, 65.7% in Japan, and 55.9% in the Democratic Republic of Congo (14–17). The vaccine acceptance rate in Turkey was similar to other countries in the world.

Participants' concerns about getting the COVID-19 vaccine, respectively, were the production of the vaccine in a short time (19.8%), fear of the side effects of the vaccine (18.9%) and not relying on the content of the vaccine (16.2%). In a study examining parents' views on the vaccine in the UK, participants complained that the vaccine development process was too short and there was not enough time for testing (18).We think that the reason for the high fear of the side effects of the vaccine in our study was due to the short test period of the vaccine, as in the study conducted (18). In other studies, similar to our study, it was stated the reasons for the negative attitudes towards the COVID-19 vaccine are Concerns about the unexpected future effects of vaccines, general distrust about the benefits and safety of vaccines, and distrust of the government and others (6–8,19). A study in Australia showed that negative attitudes towards vaccines are linked to political parties (20). To address these concerns about vaccination, vaccine companies and governments should transparently publish test results and inform the public regularly. No matter how high the vaccine efficiency is, if the society does not accept vaccination, it will not be possible to reach the desired level in the fight against both the COVID-19 pandemic and other infectious diseases. For this reason, the health education of the society should be supported as well as the efforts made in the vaccine development process and efforts should be made to eliminate vaccination hesitation.

Table 4. Comparison of Multidimensional Trust to Health-Care System Scale and Coronavirus Anxiety Scale to Socio-demographic Characteristics

	Trust in Health Care Providers		Trust in Health Care Payers		Trust in Health Care Institutions		MTHCSS		CAS	
Socio-demographic characteristics	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
Gender										
Female	35.87	8.40	13.68	3.97	9.99	2.13	59.53	12.85	2.26	3.59
Male	35.27	10.18	13.02	4.57	9.86	2.21	58.15	15.34	1.08	2.51
	t=1.076 p=0.282		**t=2.562 p=0.011***		**t=1.010 p=0.313**		**t=1.646 p=0.100**		**t=5.907 p=0.000***	
Presence of other chronic disease										
Yes	34.10	9.92	12.96	4.78	9.76	2.24	56.82	15.32	2.59	4.13
No	36.04	8.79	13.57	4.04	9.99	2.13	59.60	13.31	1.68	3.04
	t=-2.944 p=0.003*		**t=-1.994 p=0.046***		**t=-1.446 p=0.148**		**t=-2.770 p=0.006***		**t=3.800 p=0.000***	
Working status										
Working	35.41	9.36	13.39	4.23	9.89	2.13	58.68	14.04	**1.67**	3.09
Not working	36.33	8.17	13.62	4.11	10.08	2.22	60.03	13.00	**2.33**	3.78
	t=-1.572 p=0.116		**t=-0.860 p=0.390**		**t=-1.352 p=0.177**		**t=-1.507 p=0.132**		**t=-3.068 p=0.002***	
Education										
High school and below	35.26	9.70	13.32	4.91	10.14	2.30	58.73	15.49	2.24	3.62
Associate degree	35.27	10.54	13.85	4.58	10.00	2.23	59.12	15.85	1.90	3.23
Undergraduate	35.72	8.85	13.53	4.06	9.92	2.14	59.16	13.46	1.81	3.39
Postgraduate	35.90	8.59	13.15	3.98	9.88	2.08	58.93	12.71	1.74	2.91
	F=0.224 p=0.880		**F=0.866 p=0.458**		**F=0.537 p=0.657**		**F=0.047 p=0.986**		**F=0.794 p=0.497**	
Income										
≤ 4.000 TL	35.64	9.10	13.36	4.39	10.01	2.09	59.01	14.08	2.08	3.56
4.000-8.000 TL	35.53	9.24	13.56	4.13	9.96	2.25	59.05	13.96	1.71	3.09
≥ 8.000 TL	36.09	8.39	13.33	3.97	9.74	2.03	59.17	12.54	1.79	3.31
	F=0.280 p=0.756		**F=0.388 p=0.678**		**F=1.018 p=0.339**		**F=0.008 p=0.992**		**F=1.622 p=0.198**	
Adapting to pandemic measures										
Yes	**35.86**	9.24	13.54	4.22	**10.02**	2.20	**59.42**	13.98	**1.86**	3.24
No	**30.14**	12.28	12.14	4.72	**9.00**	1.84	**51.29**	16.92	**4.14**	5.78
Partially	**34.98**	7.37	13.07	4.01	**9.55**	1.87	**57.6**	11.96	**1.66**	3.34
	F=3.336 p=0.036*		**F=1.605 p=0.201**		**F=4.697 p=0.007***		**F=3.557 p=0.029***		**F=3.659 p=0.026***	

***p< 0.05**

****Mean ± SD in parametric tests were calculated. TL: Turkish Lira**

In our study, it was found that those who rejected a vaccine in the past had higher vaccine hesitancy and those who had a flu vaccine in the past had a higher positive attitude towards the COVID-19 vaccine. In a study conducted by health workers in Turkey; it has been found that those who have had the flu vaccine in the past are more willing to get the COVID-19 vaccine (21). In a study conducted in the general population in the United States, it is emphasized that participants who routinely vaccinate are more likely to get the COVID-19 vaccine (3). Similarly, a study in the UK found that those who did not have a flu vaccine in the previous year were twice as likely to be unsure of the COVID-19 vaccine (6). As can be seen from these data, the negative attitude towards the COVID-19 vaccine is not only related to the early development of the vaccine and insufficient testing. We have observed that most of the time, the COVID-19 vaccine hesitancy is caused by the doubts that existed before the pandemic.

In our study, the anti-vaccine and negative attitude towards the COVID-19 vaccine was found to be high in the participants who did not find wearing a mask useful and did not trust the modern medical system and healthcare professionals. In a study conducted in the USA, the use of masks was associated with positive vaccination intention (22). In a study conducted in Ireland and the UK, it was stated that those who were indecisive about the COVID-19 vaccine showed more distrust of experts and authority figures than those who accepted the vaccine

Tablo 5. Correlation between Subdimension of Multidimensional Trust to Health-Care System Scale and Coronavirus Anxiety Scale

Variables	Mean	SD	1	2	3	MTHCSS	CAS
Trust in Health Care Providers	35.66	9.05	1				
Trust in Health Care Payers	13.45	4.19	**0.661***	1			
Trust in Health Care Institutions	9.4	2.15	**0.609***	**0.628***	1		
MTHCSS	59.06	13.77	**0.954***	**0.838***	**0.749***	1	
CAS	1.86	3.30	-0.050	-0.054	-0.032	-0.054	1

SD: standard deviation.

***Correlation is significant 0.05 (two-tailed).**

(14). In the study of Paul et al. It was emphasized that those who adapt poorly to pandemic actions also have high negative attitudes towards vaccines (6). During the pandemic, the compliance of different groups in the society with healthcare providers and recommendations can be observed, it can be predicted in which group the vaccine acceptance is lower during the vaccination period, and initiatives can be planned by public health experts and authorities in the early period for these groups.

The negative attitude towards COVID-19 vaccination and vaccine hesitancy was found to be high in participants whose education level is primary education, who are not working, whose economic income is low, and who live in extended families. Similar to our study in a study conducted in England; Participants' low education level, low income, and not working full time were associated with vaccine hesitancy (8). In a study conducted in Ireland and England; anti-vaxxers are associated with lower income levels (14). In a study conducted in the USA, no relationship was found between low-income level and attitude towards COVID-19 vaccine, but; It is emphasized that people with low incomes may be less likely to get vaccinated (3). In Australia, low health literacy and education level also associated with vaccine hesitancy (23). In light of the foregoing findings, it has been seen that increasing the health literacy of the society has an important place in the fight against other non-infectious diseases as well as vaccine hesitation. Besides, it is recommended to consider individuals with low socioeconomic status as a risky group in terms of vaccine acceptance and to conduct studies specific to this group.

In our study, the positive attitude of healthcare professionals towards the COVID-19 vaccine was found to be higher than other occupational groups. Similarly, in the study conducted by Detoc et al., vaccine acceptance was found to be higher in healthcare workers (15). Unlike our study, the study conducted with healthcare professionals from Croatia, France, Greece, and Romania shows that there is hesitation among healthcare professionals about vaccination (24). Healthcare professionals are vulnerable to COVID-19 and work in a high-risk environment. Therefore, we think that vaccine acceptance is high among them. Health workers who are hesitant about vaccination can undermine the positive attitude to vaccination and have a strong influence on vaccine hesitations in the community. Healthcare professionals are considered to be the most reliable source of information on vaccines. For this reason, we think it is important to reach a consensus among healthcare professionals on vaccine advocacy and to be a role model for vaccine acceptance to society.

The high positive attitude towards the COVID-19 vaccine was found to be in those with higher concerns about getting COVID-19. Recent studies in Malaysia and Israel have shown that perceived risk and concern with the COVID-19 virus are associated with vaccine acceptance (25,26). In a study conducted in France, similar to our study, those with high fear of COVID-19 have been associated with COVID-19 vaccine acceptance (15). It was seen that the non-extreme fear and anxiety increased the motivation of individuals to survive and comply with the measures, in this context, the presence of the fear of COVID-19 at a level that would not have psychological harm had a positive effect on vaccine acceptance.

In our study, those who encountered the anti-vaccine news mostly on Instagram were found to have higher vaccine hesitancy scores. One study found that people who refer to social media for pandemic news are less likely to get vaccinated (19). Also, in a study conducted in Kuwait, social media followers had a higher conspiracy belief about the vaccine (27). Besides, in our study, the participants stated that they encountered anti-vaccine news on Twitter the most. From March 1, Twitter announced that misleading information about the COVID-19 vaccine will be labeled (28). The rapid and easy spread of anti-

vaccine news on social media is a public health concern. Reliable sources such as the Ministry of Health, Pandemic Scientific Board, and Professional Organizations should make an effort to ensure that individuals have access to accurate information to promote vaccination in society and to increase health literacy.

In our study, it was found that as the age of the participants increased, the negative attitude towards the COVID-19 vaccine and vaccine hesitation decreased. In a study, similar to our study results; while the highest desire for vaccination is found in the oldest age group, the most uncertainty was stated to be between the ages of 20-29 and 40-49 (16). Similarly, in a study conducted in Ireland and the UK, younger age was found to be significantly associated with vaccine hesitation or refusal (14). The reason why the elderly are more likely to be vaccinated may be the higher mortality and higher perceived risk of COVID-19 in the elderly.

Parents play an important role in decisions regarding vaccination. In our study, those who did not want to have their children vaccinated for COVID-19 had a higher negative attitude towards the COVID-19 vaccine and vaccine hesitation. Similarly, in a study conducted on healthcare professionals in Philadelphia, it was found that those who had their children had the necessary vaccinations on time were planning to get the COVID-19 vaccine (29). We think that parents care more about the perceived benefit for their children than the social benefit. Although children survive COVID-19 with milder symptoms, parents need to agree to vaccination to protect public health. Besides, studies investigating the effects of the COVID-19 vaccine on children and community immunity are needed in the upcoming period.

CONCLUSION

Vaccination is one of the most successful applications of preventive health services. Anti-vaccination is an important public health problem, as the decision to be vaccinated concerns not only the individual but the whole society. In our study, it was found that having refused the vaccine before, not considering getting a COVID-19 vaccine, not finding it useful to use a mask, not trusting the health system and expert knowledge, thinking the COVID-19 infection is artificial, low education level, not being a healthcare worker, low income level, living in a large family, not considering getting their children vaccinated, and being at a young age were the factors affecting vaccination hesitancy. Factors affecting the positive attitude towards the COVID-19 vaccine were determined as not having refused the vaccine before, considering getting the COVID-19 vaccine, finding the use of a mask useful, considering the COVID-19 infection as natural, and being a healthcare worker.

Especially the Ministry of Health and healthcare professionals should “advocate for vaccines” in every environment (written, visual media, social media, etc.), identify the false beliefs about vaccines in the society, the information and the reasons for concerns of the individuals and share the research results with a high level of evidence on this subject to spread vaccination. Vaccine companies and governments should provide a regular and transparent flow of information to the public on the benefits and scientifically proven side effects, the production and approval process of vaccines, training and campaigns should be organized. In particular, anti-vaccine statements find the opportunity to spread rapidly on social media, thereby reducing the public's trust in vaccines. The misleading attitudes of media people and expert authority figures affect the decision of the society regarding vaccination. For this reason, infollution about vaccination and anti-vaccination discourses on media platforms should be prevented, and society should be guided to the right sources of information. Health professionals should work in collaboration with policymakers to minimize the health risks associated with vaccine hesitancy.

Limitations

The limitations of the study are that the sampling method used in the study is a non-random method, data were collected online and only from individuals who agreed to participate in the study. Therefore, the results only reflect the characteristics of the participants who agreed to participate, and individuals who did not have a smartphone, computer, or internet access were not included.

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