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ATTITUDES OF PUBLIC TOWARDS COVID-19 VACCINE IN TURKEY

Türkiye'de toplumun COVID-19 aşısına yönelik tutumu

Gözde TOSUN[1], Nazım Ercüment BEYHUN[2], Murat TOPBAŞ[2], Sevil TURHAN[2], İrem DİLAVER[2], Elif ÇİL[2], Büşra PARLAK SOMUNCU[2], Cansu AĞRALI GÜNDOĞMUŞ[2]

Abstract

The aim of the study is to determine the attitude of the public towards the COVID-19 vaccine and the factors affecting the vaccination decision shortly before the start of the vaccination program in Turkey. The study was a descriptive study conducted with the participation of 1098 people aged ≥18 years living in Turkey in December 2020, when COVID-19 vaccination practices had not yet started in Turkey. The sociodemographic characteristics, chronic disease and vaccination history, COVID-19 disease history, COVID-19 vaccination decision, and fear of COVID-19 were assessed with an online questionnaire. Logistic regression analysis was performed to determine the factors affecting the vaccination decision. 42.9% (n=471) of the participants were undecided the COVID-19 vaccine. The "concerns about the side effects of COVID-19 vaccine" had the most negative impact (42.6%, n=468), on vaccination decisions. The likelihood of vaccine hesitation/rejection reduced as the "COVID-19 Fear" scale score grew (OR=0.95, %95 CI:0.93-0.97; p<0.001). Vaccine hesitation/rejection was 1.6 times higher in women (OR=1.65, %95 CI:1.24-2.20; p=0.001), 1.7 times higher among those who had not gotten an H1N1 vaccine in 2009 (OR=1.76, %95 CI:1.17-2.64; p<0.05) and 1.4 times higher (OR=1.45, %95 CI:1.06-1.98; p<0.05) in those who had never received a seasonal influenza vaccine. This study showed that there is significant vaccine hesitancy before widespread vaccination. Immunization history is one of the factors determining attitude towards a vaccine in development. The key factors influencing vaccine decisions appeared to be concerns about vaccine efficacy and safety.

Keywords: COVID-19, vaccine, vaccination.

Özet

Araştırmanın amacı, Türkiye'de aşılama programının başlamasından kısa zaman önce toplumun COVID-19 aşısına yönelik tutumunu ve aşılanma kararını etkileyen faktörleri belirleyebilmektir. Çalışma, Türkiye'de henüz COVID-19 aşısı uygulamalarının başlamadığı Aralık 2020'de, Türkiye'de yaşayan 18 yaşından büyük 1098 kişinin katılımıyla gerçekleşen tanımlayıcı tipte bir araştırmadır. Çevrim içi anket ile katılımcıların sosyodemografik özellikleri, kronik hastalık ve aşılanma öyküleri, COVID-19 hastalığı öyküsü, COVID-19 aşısı ile aşılanma kararları ve COVID-19 korkusu düzeyleri değerlendirildi. Aşı kararını etkileyen faktörleri belirlemek için lojistik regresyon analizi yapıldı. Katılımcıların %42,9'u (n=471) COVID-19 aşısı konusunda kararsız kalmıştır. Aşılama kararları üzerinde en olumsuz etkiye sahip faktör (%42,6, n=468) "COVID-19 aşısının yan etkilerine ilişkin endişeler"dir. " COVID-19 Korkusu" puanı arttıkça aşı kararsızlığı/reddi olasılığı azalmıştır (OR=0,95, %95 GA:0,93-0,97; p<0,001). Kadınlarda aşı kararsızlığı/reddi olasılığı 1,6 kat (OR=1,65, %95 GA: 1,24-2,20; p=0,001), 2009 pandemisinde influenza H1N1 aşısı olmamış olanlarda 1,7 kat (OR=1,76, %95 GA:1,17-2,64; p<0,05) ve mevsimsel influenza aşısı olmamış olanlarda 1,4 kat (OR=1,45, %95 GA:1,06-1,98; p<0,05) daha yüksektir. Bu çalışma yaygın aşılama öncesi önemli boyutlarda aşı kararsızlığı/reddi olduğunu göstermektedir. Aşılanma geçmişi geliştirilmekte olan bir aşıya yönelik tutumu belirleyen faktörlerden biridir. Aşı kararını etkileyen ana nedenlerin aşıların etkinliği ve güvenliği ile ilgili endişeler olduğu görülmüştür.

Anahtar kelimeler: COVID-19, Aşı, Aşılama.

1- TC Ministry of Health. Trabzon, Turkey
2- Karadeniz Technical University, Medical Faculty, Department of Public Health. Trabzon, Turkey

Sorumlu Yazar / Corresponding Author: Gözde TOSUN
e-posta / e-mail: : yasargozde6127@gmail.com
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ORCID: Gözde TOSUN : 0000-0002-7474-3750
Nazım Ercüment BEYHUN : 0000-0002-4664-9070
Murat TOPBAŞ : 0000-0003-4047-4027
Sevil TURHAN : 0000-0002-8534-2928
İrem DİLAVER : 0000-0002-9962-7908
Elif ÇİL : 0000-0002-0037-7786
Büşra PARLAK SOMUNCU : 0000-0002-0271-7019
Cansu AĞRALI GÜNDOĞMUŞ : 0000-0003-2911-9665

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Introduction

COVID-19, which emerged in China in December 2019 and is one of the most serious outbreaks in history, has been effective all over the world (1). Before the start of vaccination, it led to a rapid and unusual lifestyle change (2, 3). This sudden change in social life, which causes anxiety and stress, and the lack of sufficient scientific knowledge about COVID-19, the lack of experience, the application of new vaccine techniques with the developing technology in vaccine development, and the uncontrolled information flow in this process have caused disinformation all over the world. WHO drew attention to the negative consequences of disinformation with the statement "We are not only fighting a pandemic, but also an infodemic" (4).

Vaccination has been reported as the most effective tool in controlling the outbreak against COVID-19 (5). While vaccine development research continues in many countries, including Turkey, with many techniques such as mRNA, protein-based, vectorial, inactivated, attenuated, VLP, due to the rapid spread of the pandemic and the increase in deaths, societies have started to be vaccinated with vaccines approved for emergency use in countries. (6-8).

However, another issue that is as important as the development of the vaccine today is the acceptance of the vaccine among people (6). Anti-vaccination started with the first official vaccine, the smallpox vaccine, and became widespread over time (9). In recent years, scientists have reported that confidence in vaccines has further decreased, and opposition to vaccines has increased (10). In 2009, vaccine willingness in the H1N1 pandemic ranged from 17% to 67% in some European countries and the USA (United States), while only 10% of France received the H1N1 vaccine (11). A study by the COCONEL Group in March 2020 shows that 26% of respondents do not want to be vaccinated with the COVID-19 vaccine under development. This study in France suggests that it will lead to problems in vaccination strategies for COVID-19 (10).

Immunization, the first of the ten great public health achievements of the 20th century, benefits not only public health but also reducing poverty, improving equity and health systems (9). Therefore, determining the attitude of public towards the vaccine before the mass vaccination era is important in terms of providing guiding data in vaccination campaigns in the fight against future pandemics. The resulting evidence-based data may offer an opportunity to minimize the growing vaccine hesitancy and rejection.

The aim of the study was to determine Turkey's attitude towards a new vaccine (COVID-19 vaccine) before the mass vaccination period. In addition, it was aimed to determine the factors affecting the vaccination decision of the public.

Material and Method

This is a descriptive study, and the population consists of individuals aged ≥18 years living in Turkey. COVID-19 vaccinations started on January 13, 2021 in Turkey. The data was collected in December 2020 when the number of cases were increased and the curfew was resumed.

Sample and Data Collection

Due to pandemic conditions, it was not possible to conduct the surveys face-to-face or under observation. Since it was not possible to use other sampling methods and the COVID-19 vaccine was about to be released during the study, we tried to utilize easy-to-reach systems and individuals. Therefore, "convenient sampling method or convenience sampling method" was used (11,

12). With the assumption that the frequency of vaccination decision could be 50% with an unbiased approach, the minimum sample size was calculated as 384 and the maximum number of individuals aged 18 years and over constituted our sample. The sample calculation was made using the Open Epi program. Participants were invited to the study via messages sent over the internet. The study continued with snowball sampling by asking the invited people to share the survey with their environment. In the self-administered questionnaire study, 1116 questionnaires were answered, and 18 questionnaires that were filled in by those living abroad or by those under the age of 18 or by those who did not specify their age/city of residence were excluded as they did not meet the participation criteria. 1098 questionnaire data from 71 provinces were included in the study.

Questionnaire

The dependent variable of the study, the attitude towards possible COVID-19 vaccine was obtained with the question; "When approved to be used by the Ministry of Health, would you receive the developing COVID-19 vaccine?" The responses were "Yes", "No", "Not sure".

The socio-demographic characteristics of the participants; gender, age, education status, marital status, working status, having children, being a healthcare worker, living with a healthcare worker at home, living with an individual aged 65 and over at home, were also questioned. In addition, other factors that may affect the decision regarding the possible COVID-19 vaccination; chronic disease status, living with a person with chronic disease at home, history of COVID-19, presence of people with COVID-19 disease in the environment, death in the environment due to COVID-19, and the Fear of COVID-19 Scale, with the prediction that there may be a fear of COVID-19, were added to the data collection form. History of vaccination with the adult vaccine(s), seasonal flu vaccine, and pandemic H1N1 vaccination of the participants were also questioned. The average completion time of the questionnaire was 13 minutes.

The Fear of COVID-19 Scale is a single-factor, 5-point Likert-type (1 = I strongly disagree; 5 = I strongly agree) scale consisting of 7 questions. The scale is developed by Ahorsu et al. and validity and reliability for Turkish were conducted by Ladikli et al. with score of Cronbach's Alpha as 0.86 (13, 14). The scale has no cut-off value, the minimum possible score is 7, and the maximum score is 35. Those who score higher are considered to have a higher level of fear of COVID-19.

Statistical Analysis

The data were analyzed with the SPSS 24.0 package program. Numbers and percentages were used to summarize the characteristics of the participants. The Fear of COVID-19 Scale score is shown as mean and standard deviation. Kolmogorov-Smirnov and Shapiro-Wilk tests were used to determine the conformity of the data to normal distribution. The Pearson Chi-square test was applied in the univariate analysis in order to compare the COVID-19 vaccination decision with the characteristics of the participants. Binary logistic regression analysis was used to predict the relationships of the variables with the COVID-19 vaccination decision. In the logistic regression analysis, those whose vaccination decisions were "Yes" were taken as reference. Variables as the possible risk factors for "No/Undecided" decision for vaccination (gender, age, chronic disease status, living together with a healthcare worker at home, presence of individuals with COVID-19 in the environment, attitude towards adult vaccination, pandemic influenza (H1N1) vaccination, attitude towards seasonal flu vaccination) and the COVID-19 fear score were also modeled. For this model variables showed $p<0.05$ in Chi-square analyzes were selected. Effect sizes of risk factors were measured with odds ratios (OR) at a 95% confidence interval (CI).

Ethical considerations

Firstly, the Turkish Republic Ministry of Health Scientific Research Platform authorized the research, then the ethical approval for the study was obtained from the Scientific Research Ethics Committee of KTU Faculty of Medicine (Date: 21.12.2020 and Number: 24237859/761).

Results

The majority of participants were women and 12.2% reported having COVID-19. The other sociodemographic characteristics of the participants are as in Table 1.

The majority of the participants stated that they were undecided about being vaccinated with COVID-19 vaccine. According to the answers given to the question about the situations affecting the decision to be vaccinated, the most influential situation was "If the COVID-19 vaccine has side effects, I would not consider getting vaccinated". The second most influential situation was "If the COVID-19 vaccine is effective in preventing the disease for a long time, I will get vaccinated". In addition, participants stated that they would be vaccinated if scientists were vaccinated, healthcare professionals were vaccinated and senior public administrators were vaccinated, respectively (Table 2).

The willingness to be vaccinated with a potential COVID-19 vaccine was found to be statistically significantly higher among males, among those who stated that they lived with a healthcare worker at home, among those with chronic diseases, and among those who had people that contracted COVID-19 disease around them ($p<0.05$). Also being vaccinated in adulthood, being vaccinated with seasonal influenza vaccine at least once in life, and being vaccinated with pandemic influenza (H1N1) vaccine in 2009 were significantly related to the willingness to receive COVID-19 vaccine ($p<0.05$). A significant difference was not found in terms of willingness to be vaccinated between healthcare workers and non-healthcare workers (Table 3).

In logistic regression analysis, female gender, being in the 26-35 age group, not living in the same household with a healthcare worker, not having received H1N1 influenza vaccine, never having received seasonal influenza vaccine, and COVID-19 fear level were found to be factors with a high likelihood of vaccine vaccine hesitancy/rejection for COVID-19 (Table 4).

Table 1: Characteristics of the participants (N=1098).

Parameters	n	%
Gender		
Female	745	67.9
Male	353	32.1
Categorized age (mean±SD)	35.4±10.4	
18-25 years	185	16.8
26-35 years	440	40.1
36-50 years	380	34.6
51 years and above	93	8.5
Marital status		
Married	723	65.8
Single	375	34.2
Educational status		
Literate/Primary school graduate	30	2.7
Secondary school graduate	23	2.1
High school graduate	159	14.5
University degree	886	80.7
Do you have a job you are currently working in?		
Yes	774	70.5
No	324	29.5
Are you a healthcare worker?		
Yes	390	35.5
No	708	64.5
Is there a healthcare worker living with you at home?		
Yes	190	17.3
No	908	82.7
Chronic disease state		
Has chronic illness	127	11.6
No chronic disease	971	88.4
COVID-19 infection status		
Yes	134	12.2
No	964	87.8
Presence of individuals who have contracted COVID-19 in their environment		
Yes	930	84.7
No	168	15.3
Presence of death due to COVID-19 in the environment		
Yes	500	45.5
No	598	54.5
Vaccination status in adulthood		
Yes	747	68.0
No	351	32.0
Seasonal flu vaccination status of the participants		
Received at least once	281	25.6
Never received	817	74.4
H1N1 vaccination status of the		
Yes	133	12.1
No	965	87.9
Fear of COVID-19 score (Mean±SD)	19.2±5.8	

SD, standard deviation.

Table 2: Attitudes of the participants towards the COVID-19 vaccine.

Parameters	n	%
Are you going to get the potential COVID-19 vaccine under development when it is reported that is suitable for use by the Ministry of Health? (n=1098)		
Undecided	471	42.9
Yes	374	34.1
No	253	23.0
Conditions that affecting the vaccination decision of the participants (n=1098)		
I would not consider getting vaccinated if the potential COVID-19 vaccine in development has side effects.	468	42.6
I will get vaccinated, if the potential COVID-19 vaccine in development is effective in preventing the disease for a long time.	462	42.1
Even if I have the COVID-19, I would get the potential COVID-19 vaccine in development so that I do not get sick again and not be a carrier.	178	16.2
I would not consider getting the possible COVID-19 vaccine in development, if I get COVID-19.	164	14.9
Even if the potential COVID-19 vaccine in development is short-term effective in preventing the disease, I would get vaccinated.	133	12.1
Even if the potential COVID-19 vaccine in development has side effects, I would get vaccinated.	29	2.6
How does the cost of the potential COVID-19 vaccine in development affect your decision to get vaccinated? (n=1098		
The cost of the vaccine does not affect my decision, I don't plan to get vaccinated.	356	32.4
The cost of the vaccine does not affect my decision, I get the vaccine when the potential COVID-19 vaccine in developed is reported to be suitable for use by the Ministry of Health.	348	31.7
I can get vaccinated for a reasonable fee.	247	22.5
I can get vaccinated only if it's free.	120	10.9
Other	27	2.5
How does the origin of the potential COVID-19 vaccine in development affect your decision to get vaccinated? (n=1098)		
Whether the potential COVID-19 vaccine in development is domestic or imported does not affect my decision, I get the vaccine when it is declared suitable for use by the Ministry of Health.	386	35.2
Whether the potential COVID-19 vaccine in development is domestic or imported does not affect my decision, I do not get the vaccine.	333	30.3
If the potential COVID-19 vaccine in development is domestic, I will get the vaccine when it is declared suitable for use by the Ministry of Health.	298	27.1
If the potential COVID-19 vaccine in development is imported, I will get the vaccine when it is declared suitable for use by the Ministry of Health.	81	7.4
Which groups of the following is vaccinated, you will get vaccinated? (n=1098)		
Scientists	640	58.3
Healthcare workers	422	38.4
Vaccination of developed countries	391	35.6
Senior public administrators	267	24.3
None	248	22.6
Relative/close environment	84	7.7
Journalists	42	3.8
Artists	34	3.1

Table 3: Pairwise comparisons of participants' characteristics and willingness to be vaccinated with the COVID-19 vaccine.

Parameters	Yes		No/Undecided		p
	n	%	n	%	
Gender					
Female	227	30.5	518	69.5	**<0.001**
Male	147	41.6	206	58.4	
Age					
18-25 years	67	36.2	118	63.8	**<0.001**
26-35 years	130	29.5	310	70.5	
36-50 years	123	32.4	257	67.6	
51 years and above	54	58.1	39	41.9	
Educational status					
Literate/Primary school graduate	10	33.3	20	66.7	0.781
Secondary school graduate	10	43.5	13	56.5	
High school graduate	56	35.2	103	64.8	
University degree	298	33.6	588	66.4	
Marital status					
Married	253	35.0	470	65.0	0.366
Single	121	32.3	254	67.7	
Current working status					
Yes	263	34.0	511	66.0	0.929
No	111	34.3	213	65.7	
Being a Healthcare Worker					
Yes	143	36.7	247	63.3	0.176
No	231	32.6	477	67.4	
Living with a healthcare worker at home					
Yes	86	45.3	104	54.7	**<0.001**
No	288	31.7	620	68.3	
Chronic disease					
Yes	63	49.6	64	50.4	**<0.001**
No	311	32.0	660	68.0	
COVID-19 infection status					
Yes	41	30.6	93	69.4	0.366
No	333	34.5	631	65.5	
Individuals who have contracted COVID-19 disease in the environment					
Yes	304	32.7	626	67.3	**0.024**
No	70	41.7	98	58.3	
Death due to COVID-19 in the environment					
Yes	178	35.6	322	64.4	0.325
No	196	32.8	402	67.2	
Vaccination status in adulthood					
Yes	273	36.5	474	63.5	**0.011**
No	101	28.8	250	71.2	
Seasonal flu vaccine					
Received at least once	130	46.3	151	53.7	**<0.001**
Never received	244	29.9	573	70.1	
H1N1 vaccination status in 2009					
Yes	70	52.6	63	47.4	**<0.001**
No	304	31.5	661	68.5	

Table 4: Factors affecting possible COVID-19 vaccine hesitancy or rejection in a logistic regression model.

Parameters	OR*	95% CI Lower limit	Upper limit	p
Gender				
Male	1			
Female	1.65	1.24	2.20	**0.001**
Age				
51 years and above	1			
36-50 years	0.71	0.40	1.25	0.247
26-35 years	1.59	1.06	2.38	**0.023**
18-25 years	1.46	0.99	2.14	0.054
Chronic disease				
Yes	1			
No	1.41	0.93	2.14	0.103
Living with a healthcare worker at home				
Yes	1			
No	1.53	1.09	2.14	**0.014**
Individuals who have contracted COVID-19 in the environment				
No	1			
Yes	1.37	0.96	1.96	0.082
Adult vaccination				
Yes	1			
No	1.23	0.90	1.67	0.179
H1N1 vaccination				
Yes	1			
No	1.76	1.17	2.64	**0.006**
Seasonal flu vaccination				
Received at least once	1			
Never received	1.45	1.06	1.98	**0.018**
Fear of COVID-19 score	0.95	0.93	0.97	**<0.001**

** OR, Odds Ratio*

Nagelkerke R^2:0.116 X^2:96.007 p<0.001

Discussion

In December 2020, when we collected the data, COVID-19 was causing unprecedented devastation. Therefore, a vaccine against COVID-19 was eagerly awaited around the world. In addition to the magnitude of the devastation, the main point that increases the importance of the study is to determine the public attitude towards vaccines developed with new techniques against an emerging disease. Determining the extent to which the public's attitudes towards the upcoming vaccination will be in line with actual vaccination rates will be a resource for widespread vaccination in possible future pandemics.

Pandemic control is only possible if about 70% of the population is immunized by being vaccinated or infected (16). In the light of this information, it is seen that the willingness to be vaccinated in our study is lower than necessary. 34.1% of the participants stated that they wanted to be vaccinated with a COVID-19 vaccine approved by the Ministry of Health, 23% said they refused, and 42.9% said "I am not sure".

Studies show differences in countries' willingness to be vaccinated with the COVID-19 vaccine. In studies in European

countries, Turkey has among the highest likelihood of vaccine hesitancy/rejection. In Italy, the proportion of potential COVID-19 vaccinees is 59%. Although Italy is one of the European countries with the highest likelihood of vaccine hesitancy/rejection, Turkey's likelihood of vaccine hesitancy/rejection is well above that of Italy (17). According to Neumann-Böhme et al.'s study of willingness to be vaccinated in Europe with 7664 participants from seven countries; the highest demand for COVID-19 vaccine was found in England and Denmark with 80%, the highest vaccine rejection in Germany and France with 10%, and the highest undecided group in France with 28% (6). In a survey conducted in Poland in June 2020, 28% of respondents said they would not get COVID-19 vaccine, while 34% were undecided. The willingness of Poles to be vaccinated is higher than in Turkey at 37% (18). According to the results of Salali and Uysal's study investigating the effects of conspiracy theories on the COVID-19 vaccine decision in Turkey and England, vaccine hesitancy was 31%, and vaccine reluctance was 3% in Turkey (19). These results are considerably lower than the likelihood of vaccine hesitancy and vaccine reluctance in our study. The reason for this difference may be that a vaccine that has not received emergency use approval from WHO will be used in the vaccination program, which will start shortly after December 2020, when we conducted the study. Moreover, the difference in the study conducted in May 2020 compared to our study which conducted in December 2020 may be due to the effect of anti-vaccination campaigns in the social media. A study conducted in Australia in April 2020, investigating the participants' attitudes towards the seasonal flu vaccine and future COVID-19 vaccine, reported that 76.5% of the respondents were willing to have the seasonal flu vaccine in 2020, and 85.8% were willing to receive a potential COVID-19 vaccine (20). In New Zealand, the willingness to vaccinate against COVID-19 was 74%, and vaccine rejection was 13% (21). In a survey of 2058 people in China, 91.3% of respondents reported that they would receive a safety-approved vaccine (22). Research shows that China is the country with the highest willingness for a potential COVID-19 vaccine (23). In a study involving 3414 people in Jordan, Kuwait, and other Arab Unity countries in December 2020, the acceptance of a potential COVID-19 vaccine was reported as 29.4% (24). A study conducted by Fisher et al. in the USA in April 2020 with the participation of 1003 people reported that 57.6% of the participants were undecided about vaccination with a potential COVID-19 vaccine, and 10.8% were reluctant to get vaccinated (25). Another study in the USA, by Pogue et al. with 316 participants reported that 68.5% of the participants would get vaccinated when a vaccine is developed (26).

The most affecting situation of people's decision on getting vaccinated was "I wouldn't consider getting vaccinated if the COVID-19 vaccine has a side effect" with 42.6% (468 people). The second most affecting situation with 42.1% (462 people) was "If the COVID-19 vaccine is effective in preventing the disease for a long time, I will get vaccinated''. Like our study, Sandhofer et al. examined the reasons for anti-vaccine, the most reported reasons were concerns and doubts about the efficacy/safety of vaccines and distrust towards pharmaceutical industry in Australia (27). It supports the studies in the literature that concerns and doubts about the efficacy/safety of the vaccines in this study are the main reasons for vaccine hesitancy/rejection (17, 22, 26, 28). It is clear that the concerns and the doubts about the efficacy and safety of the vaccines are one of the main reasons for vaccine hesitancy/rejection.

The situations that would increase participants' confidence in vaccines were questioned with the foresight that towards a newly developed pandemic vaccine would be high insecurity. The situations that can affect the vaccine decision the most were found as "Vaccination of scientists", "Vaccination of Healthcare workers",

"Vaccination of developed countries". Those who stated that they would be vaccinated if "senior public administrators are vaccinated" remained at a very low level of 24.3%. This result shows that the level of trust of the society in the current administration and health policies can be decisive for the implementation of a new vaccine at the social level. The results of the COCONEL Group's study in France shows that political beliefs of the people are also playing an important role on vaccine hesitancy (10). Kennedy J's study in Southern Europe in 2017 also shows that the vaccine decision is influenced by trust in policy makers (29).

According to the results of the logistics regression analysis, the factors related to the vaccination decision of a possible COVID-19 vaccine of the participants were; gender, age, chronic disease status, living with a healthcare worker at home, presence of individuals with COVID-19 disease in their environment, history of adulthood vaccines and pandemic influenza (H1N1) vaccination, seasonal flu vaccination status, and the level of fear of COVID-19. The most important risk factors for vaccine hesitancy/rejection were female gender and not being vaccinated with the pandemic influenza H1N1 vaccine in 2009. Females were found to be 1.6 times more vaccine hesitancy/rejection odds ratio for the COVID-19 vaccine than males (OR=1.6, 95% CI:1.24-2.20, p=0.001). Females may experience more vaccine hesitancy/rejection because of higher feelings of anxiety and concern related to fertility and motherhood/pregnancy. Therefore, they may need more evidence and time-concerning the safety of the new vaccines. In studies conducted in the USA, Arab Unity countries and Salali and Uysal's study, the female gender was determined as a risk factor for the vaccine hesitancy/rejection for the COVID-19 vaccine (19, 24-26).

The vaccine hesitancy/rejection of individuals aged 26-35 was 1.5 times higher than those aged 51 and older (OR=1.5, 95% CI:1.06-2.38, p<0.05), and the vaccine hesitancy/rejection of individuals aged 18-25 was 1.4 times higher than in individuals aged 51 and over (OR=1.4, 95% CI:0.99-2.14, p=0.054). The vaccine stability of individuals in the 36-50 age group showed a significant difference compared to those aged 51 and over. This can be explained by the majority of individuals aged 36 and over, with their parental responsibilities and their higher desire for protection from COVID-19 than younger people. Younger people's reluctance to get vaccinated may also be because of vaccine safety concerns due to their reproductive age or low COVID-19 fear levels. In a study conducted in Italy, the willingness of middle-aged people to receive the COVID-19 vaccine is higher than younger ones, which is similar to our study (15).

Chronic disease history was not associated with vaccine hesitancy/rejection in this study (p=0.103). Despite the fact that the statements in the media that those with chronic diseases have a more severe COVID-19 disease, the presence of chronic disease is not effective in the decision of vaccination may be due to the high risk of a new vaccine.

In our study, being a healthcare worker was not found associated with vaccine hesitancy/rejection. In a study on vaccine acceptance in Indonesia, healthcare workers' willingness to vaccinate was 2 times higher for a vaccine with 95% efficacy and 1.57 times higher for a vaccine with 50% efficacy. In addition, for a low-efficacy vaccine, being a healthcare worker was the only factor associated with vaccine willingness in İndonesia (28). On the other hand, in our study, the vaccine hesitancy/rejection of those living in the same house with a healthcare worker was statistically significantly higher (OR=1.5, 95% CI:1.09-2.14, p<0.05). In this context, those living in the same house as healthcare workers may perceive a new vaccine higher risky than COVID-19. Meanwhile, there was no statistically significant difference among of the participants in the presence of an individual with COVID-19 disease in their environment for the vaccine hesitancy/rejection (p=0.082).

People make the decision to be vaccinated for an epidemic disease according to the perceived risk. People, who

perceives the disease as low risk disease, see a new vaccine as high risk. The low number of H1N1-related deaths during the influenza pandemic in 2009 led to low vaccination coverage. However, in a pandemic with higher mortality rates, the risk of the disease may be perceived higher than a new vaccine (30).This study may indicate that, during the COVID-19 pandemic, participants perceive the risk of a new vaccine to be higher than the risk of COVID-19 disease. This situation also manifests itself with the fear of COVID-19, which we evaluated. As the COVID-19 fear score of the participants increased, the odds ratio of vaccine hesitancy/rejection decreased (OR=0.9, 95% CI:0.93-0.97, p<0.001). A study conducted in the USA also found that the greater the perceived impact of the pandemic, the higher the willingness to be vaccinated against COVID-19 (26).

Considering the vaccination history, there was no statistically significant difference in terms of the COVID-19 vaccine decision between those who were vaccinated with any adult vaccine after the age of 18 and those who were not (p=0.179). In the USA, those who had routine vaccinations in the past were found to be eager for the COVID-19 vaccine (26). The results of the study conducted in the USA are different from the results of this study conducted in Turkey. In our study, vaccine hesitancy/rejection was 1.7 times higher in those who did not have the pandemic influenza (H1N1) vaccine in the 2009 outbreak (OR=1.7, 95% CI:1.17-2.64, p<0.05), and 1.4 times higher in those who had never had the seasonal flu vaccine before (OR=1.4, 95% CI:1.06-1.98, p<0.05). A study in Australia supports our study that seasonal flu vaccination is positively associated with the willingness to be vaccinated against COVID-19 (20). Likewise, in the USA, those who had routine vaccinations in the past were found to be eager for the COVID-19 vaccine (26). In addition, the study by Pogue et al. found that vaccination history affects the decision to be vaccinated with the COVID-19 vaccine. Our study, also, supports these findings from previous studies that the vaccination history plays an important role for willingness towards COVID-19 vaccinations.

Limitations of the study

Since the main purpose of descriptive studies is to define the problem, it may not be necessary to examine the entire group at risk (15). For this descriptive study, consideration was that the number of participants was appropriate and sufficient, and the results, although not entirely generalizable, could provide important information.

Participants consist of individuals over the age of 18 who can only use the internet throughout Turkey. Therefore, participation over the age of 65 is below the desired level. In addition, in self-answered questionnaires, responses are based on respondents' perceptions of the questions.

Conclusion

In conclusion, this study showed that there is significant vaccine instability before widespread vaccination. In order to eliminate doubts and concerns about the COVID-19 vaccine, which is one of the most important reasons for vaccine hesitancy/rejection, infodemic should be prevented and the public should be enlightened with scientific data.

When individuals decide to be vaccinated with the COVID-19 vaccine, they mostly consider the decision of scientists and healthcare professionals to be vaccinated.

The vaccination history is one of the factors determining attitude towards a newly developed vaccine.

The vaccine hesitancy/rejection rate is high in those living with healthcare workers, who are among the risk groups of COVID-19 disease, shows that concerns about vaccine safety are higher than concerns about fatality and morbidity of the disease.

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