

Barriers, vaccine hesitancy and attitudes towards the to the covid-19 vaccine in Türkiye

Melike Yalçın Gürsoy¹ 

Fatme Chousko Mehmet² 

¹Department of Public Health Nursing, Faculty of Health Sciences, Çanakkale Onsekiz Mart University, Çanakkale / Türkiye

²Graduate Student, Çanakkale Onsekiz Mart University, Çanakkale / Türkiye

Abstract

This study aimed to determine the barriers, vaccine hesitancy and attitudes towards the to the COVID-19 vaccine in Türkiye. A cross-sectional study included 2031 people aged 18 years and older living in Türkiye. Data were collected through an online questionnaire created by the researchers in line with the literature and the Attitudes towards the COVID-19 Vaccine (ATV-COVID-19) scale. In total, 1043 participants (51.4%) defined themselves as vaccine hesitant. The most-motivating factor for vaccination was protecting self and family, while thinking that vaccines are unsafe was the most common barrier against vaccination. Compared to females, being male (OR=0.770) had a 1.3-times (1/0.770) protective effect from vaccination hesitancy, while one unit increase in the ATV-COVID-19 score (OR=0.080) was 12.5-times (1/0.080) protective. As a result of the study, it was observed that there was a high level of vaccine hesitancy due to mistrust of COVID-19 vaccines or fear of side effects. In addition, vaccine hesitancy was associated with gender and the level of attitude towards the vaccine.

Keywords: Attitude, barrier, COVID-19, vaccine, vaccine hesitancy

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Corresponding Author:
Melike Yalçın Gürsoy
Email: myalcin@comu.edu.tr



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Introduction

Pandemics that have affected countries, continents, and even the whole world have caused significant health problems worldwide from past to present [1]. As one such pandemic, COVID-19, is a highly contagious respiratory disease caused by the SARS-CoV-2 virus. [2]. As a result, the World Health Organization (WHO) declared the outbreak a public health emergency of international concern on January 30, 2020 [3]. As of the end of September 2021, COVID-19 caused approximately a quarter billion cases and around 5 million deaths globally [4]. For this reason, many researches are being carried out for the prevention, early diagnosis and treatment of COVID-19 in the world [5]. However, no specific treatment has been found. Therefore, vaccination is probably the best strategy for controlling the COVID-19 pandemic [6,7].

Vaccines are among the most effective preventive measures in public health. Given the high contagiousness of COVID-19, a large percentage of the population must be vaccinated to establish herd immunity [8]. Therefore, the WHO aims to vaccinate 70% of the world's population by June 2022 [4]. However, in many studies conducted in the world and in Türkiye, it has been revealed that there are hesitations about COVID-19 vaccines [9-14]. Vaccine hesitancy, which is defined as the delayed acceptance or rejection of the vaccine despite the availability of vaccination services [15], is seen as a severe threat to the control of the disease [16]. The disease's novelty, the rapid development of the vaccine, and the concerns about the safety and effectiveness of the vaccine have caused some individuals to develop negative thoughts about being vaccinated [17]. To increase the acceptability of the COVID-19 vaccine and reduce hesitation, it is crucial to conduct studies that reveal the extent of the situation and related factors. Therefore, this study aims to determine the barriers, vaccine hesitancy and attitudes towards the to the COVID-19 vaccine in Türkiye.

Materials and Methods

Study Design and Participants

Approval for the research (2021-YÖNP-0832;

20/24) was obtained from the Ethics Committee of Çanakkale Onsekiz Mart University. Consent from the participants was obtained through the informed consent form at the beginning of the online questionnaire. The population of this cross-sectional study consisted of people aged 18 and over (60,863,705) living in Türkiye. In the calculation made using the Epi Info 7.2 program, the sample size was determined as 1308 when at a 95% confidence interval, the incidence of the variable of interest (p), and the margin of error (d) were 0.05 and 5%, respectively. The research was completed with 2031 people who agreed to participate. All participants were Turkish citizens at the age of 18 or over.

Procedure

This study was conducted online from November to December 2021. A data collection form was created using the 'Google Forms' platform and the link to the form was distributed via social media. The data were collected with the questions created by the researchers in line with the literature [11,13,18] and ATV-COVID-19 scale. The 9-item scale, developed by Geniş et al. (2020), has two sub-dimensions: positive and negative attitude [19]. The statements in the scale are evaluated as "Strongly disagree (1)," "Disagree (2)," "Undecided (3)," "Agree (4)," and "Strongly agree (5)" [19]. High scores obtained from the positive attitude sub-dimension indicate that the attitude towards the vaccine is positive. In this study, the *Cronbach's* alpha value of the scale was calculated as 0.91.

Variables

The study's dependent variables were COVID-19 vaccine hesitancy and attitude scale towards COVID-19 vaccines. The independent variables were age, sex, region of residence, marital status, educational status, employment status, income perception, alcohol use, physical activity, health perception, presence of chronic disease, and flu vaccination status.

Statistical Analysis

Statistical analysis was done using the Statistical Package for the Social Sciences (SPSS) software program, version 25.0. Descriptive statistics, Chi-square analysis, and logistic regression analysis

were used to evaluate the data. For the statistical significance, a value of $p < 0.05$ was considered sufficient.

Results

Descriptive Findings

The mean age of the participants was 31.4 ± 12.8 years. Most participants were from rural regions. Of the participants, 67.4% ($n=1368$) were women, 97.4% ($n=1959$) were Turkish citizens, 88.7% ($n=1802$) lived in urban areas, and 54.5% ($n=1107$) lived in the Marmara region. 56.7% ($n=1152$) were single, 62.2% ($n=1263$) had no children. 49.7% ($n=1010$) are university graduates and 43.9% ($n=891$) are working, 47.7% ($n=969$) define their income as equivalent to their expenses. Of the participants, 31.8% ($n=645$) smoked, 31.7% used alcohol, and 44.9% ($n=912$) exercised occasionally. In addition, 75.8% ($n=1541$) perceive their health as good and 18.8% ($n=370$) had chronic diseases. Furthermore, 3.8% ($n=77$) of the participants had influenza vaccination every year and 6.5% ($n=132$) in the last year. Other participant features are presented in Table 1.

Motivating Factors vs. Barriers Against Vaccination

From the 1879 participants (92.5%) who were vaccinated against the COVID-19, 77 (4.1%) had one shot, 1499 (79.8%) two shots, 221 (11.8%) three shots, and 82 (4.4%) four shots. While 48.6% ($n=986$) trusted the vaccine, 11.5% ($n=233$) had no trust, and 39.9% ($n=810$) were not sure. Furthermore, 1043 participants (51.4%) defined themselves as vaccine hesitant. The most-motivating factor for vaccination was protecting self and family while thinking that vaccines are unsafe was the most common barrier against vaccination (Table 2).

Univariate Comparisons

Cronbach's alpha internal validity score of the 9-item Attitudes towards the COVID-19 Vaccine (ATV-COVID-19) scale was calculated as 0.914. Mean (\pm SD) values for the total ATV-COVID-19, ATV-COVID-19 positive, and ATV-COVID-19 negative scores were 3.5 ± 0.8 , 3.7 ± 1 , and 3.4 ± 0.8 , respectively. ATV-COVID-19 scores were significantly associated with all the analyzed

variables. There was no significant difference between the scores of males and females, but those not disclosing their sex had substantially lower values. High school graduates, people with poor/very poor health perceptions, and those with vaccine hesitancy had significantly lower scores in their categories. On the other hand, people with chronic diseases or those vaccinated against flu or COVID-19 had considerably higher scores (Table 3). There was a significant positive correlation between age and total ATV-COVID-19 scores (Spearman $r=0.202$, $p < 0.001$).

Vaccine hesitancy was associated with most of the studied variables too. Women and participants not disclosing their sex had higher vaccine hesitancy than men. Higher vaccine hesitancy was observed in high school graduates and those without chronic diseases (Table 4).

Factors Associated with Vaccine Hesitancy

A binary logistic regression analysis was performed to check for factors affecting the main outcome variable vaccination hesitancy (present/absent) after correcting potential confounders. All significant variables in the univariate comparisons were entered into the model. The model revealed a Nagelkerke R square of 51% and a sensitivity and specificity of 79.9% in detecting vaccination hesitancy. The regression analysis showed that male sex and higher ATV-COVID-19 scores were the only independent predictors of vaccination hesitancy. Compared to females, being male (OR=0.770) had a 1.3-times ($1/0.770$) protective effect from vaccination hesitancy, while one unit increase in the ATV-COVID-19 score (OR=0.080) was 12.5-times ($1/0.080$) protective (Table 5).

Table 1. Participant features.

		n	%
Sex	Female	1368	67.4
	Male	651	32.1
	Not disclosed	12	0.6
Region	Middle Anatolia	226	11.1
	East Anatolia	128	6.3
	South-East Anatolia	64	3.2
	Aegean	172	8.5
	Marmara	1107	54.5
	Mediterranean	106	5.2
	Black Sea	228	11.2
Marital status	Married	808	39.8
	Single	1152	56.7
	Divorced	61	3
	Widowed	10	0.5
Educational status	Primary school	53	2.6
	Middle school	47	2.3
	College	717	35.3
	University	1010	49.7
	Masters/PhD	204	10
Employment	Working	891	43.9
	Not working	221	10.9
	Unemployed	31	1.5
	Housewife	64	3.2
	Retired	80	3.9
	Student	744	36.6
Income/Expenses	Balanced	969	47.7
	Minus	801	39.4
	Plus	261	12.9
Alcohol consumption	Yes, regularly	194	9.6
	No	1394	68.6
	Yes, rarely	443	21.8
Physical activity	Yes, regularly	399	19.6
	No	720	35.5
	Yes, irregularly	912	44.9
Health perception	Excellent	275	13.5
	Good	1266	62.3
	Average	460	22.6
	Poor	27	1.3
	Very poor	3	0.1
Flu vaccination	Each year regularly	77	3.8
	Once every 2-3 years	95	4.7
	1-2 times	484	23.8
	Never	1375	67.7

Discussion

Vaccination appears to be the most effective strategy to control the COVID-19 infection, causing devastating health problems worldwide since 2020 [16]. However, the results of this study showed that 51.4% of the participants were hesitant about the vaccine. In many studies conducted in different countries, there is hesitancy about COVID-19 vaccines at varying rates [20-24]. These differences between countries may be due to the socio-demographic and cultural characteristics of the study group. However, although approximately half of the participants were vaccine-hesitant in the current study, the vaccination refusal rate was 7.5%. In a previous study conducted by Salali et al. (2020) in Türkiye,

it was reported that 31% of the participants were hesitant about vaccination, and 3% refused to be vaccinated [13]. It is noteworthy that there has been a significant increase in both hesitation and rejection rates over time. To develop strategies to increase COVID-19 vaccination rates, it is essential to understand the factors that encourage and hinder vaccination. In the current study, protecting oneself/family and relying on the protective effects of vaccines were among the most encouraging factors. Similarly, in the study of Arce et al. (2021), the most common reason for vaccine acceptance was personal protection against COVID-19 infection [25]. Also, thinking that vaccines are unsafe, and fear of side effects were among the most common barriers to getting

Table 2. Motivating and barrier factors for COVID-19 vaccination.

Motivating Factors for Vaccination	n	%
Protecting self and family	1047	50.4
Relying on the protective effects of vaccines	947	45.6
Advice from healthcare professionals	790	38.1
Obligations by the school	431	20.8
Perception of being under risk	374	18
Results of own investigation	324	15.6
Presence of chronic diseases	167	8
Obligations by the employer	154	7.4
News in the media	142	6.8
Vaccine being free	124	6
Traveling abroad	112	5.4
Advice from religious leaders	13	0.6
Barriers to vaccination	n	%
Thinking that vaccines are unsafe	94	4.5
Afraid of the side effects of the vaccine	84	4
Thinking that vaccines contain harmful substances	55	2.6
Thinking that vaccines tamper the human DNA	39	1.9
Perceived no need because handwashing, wearing a mask and gloves	30	1.4
Perception of not being under risk	24	1.2
Being generally against all vaccines	20	1
Fatalism	16	0.8
Thinking that vaccines contain religiously forbidden substances	16	0.8
Afraid of getting infertile	15	0.7
Afraid of getting vaccinated	14	0.7
Is allergic	13	0.6
Having chronic diseases	8	0.4
Lack of knowledge	5	0.2

Table 3. Univariate comparison of the ATV-COVID-19 scores between the studied variables.

Variables	ATV-COVID-19 score				ATV-COVID-19 positive				ATV-COVID-19 negative			
	Mean	SD	F	p	Mean	SD	F	p	Mean	SD	F	p
Sex												
Female (n=1368)	3.5 ^a	0.8	5.755	0.003	3.7 ^a	1	5.040	0.008	3.5 ^a	0.8	5.065	0.006
Male (n=561)	3.5 ^a	0.8			3.7 ^a	1.1			3.5 ^a	0.8		
Not disclosed (n=12)	2.7	0.7			2.8	1			2.7	0.7		
Educational status												
Primary s. (n=53)	3.9 ^a	0.9	9.615	<0.001	4.0 ^a	1.1	7.198	<0.001	3.8 ^a	1	9.659	<0.001
Secondary s. (n=47)	3.6 ^{ab}	0.9			3.8 ^{ab}	1.1			3.5 ^{ab}	1		
High s. (n=717)	3.4 ^b	0.7			3.6 ^b	1			3.3 ^b	0.7		
University (n=1010)	3.6 ^a	0.8			3.7 ^a	1			3.5 ^a	0.8		
Masters (n=204)	3.7 ^a	0.9			3.9 ^a	1.1			3.6 ^a	0.9		
Health perception												
Excellent (n=275)	3.5 ^{ab}	0.9	4.157	0.006	3.7 ^{ab}	1.2	3.819	0.01	3.4 ^a	0.9	3.548	0.014
Good (n=1266)	3.6 ^a	0.8			3.7 ^a	1			3.5 ^a	0.8		
Average (n=460)	3.5 ^{ab}	0.8			3.6 ^{ab}	1			3.4 ^a	0.8		
Poor/very poor (n=30)	3.2 ^b	0.9			3.2 ^b	1.1			3.1 ^a	0.8		
Chronic disease												
Yes (n=370)	3.7	0.8	4.005	<0.001	3.9	1	3.940	<0.001	3.6	0.8	2.923	0.004
No (n=1661)	3.5	0.8			3.7	1			3.4	0.8		
Flu vaccination in the last year												
Yes (n=133)	3.8	0.7	4.234	<0.001	4.0	0.8	3.858	<0.001	3.7	0.8	4.015	<0.001
No (n=1899)	3.5	0.8			3.7	1			3.4	0.8		
COVID-19 vaccination												
Yes (n=1879)	3.6	0.7	18.290	<0.001	3.8	0.9	18.521	<0.001	3.5	0.8	15.190	<0.001
No (n=152)	2.4	0.8			2.3	1			2.5	0.8		
Vaccine hesitancy												
No (n=986)	4.0	0.6	34.362	<0.001	4.3	0.7	30.623	<0.001	3.9	0.7	30.959	<0.001
Yes (n=1043)	3.0	0.7			3.1	0.9			3.0	0.7		

Each superscript letter denotes a subset of categories whose column means do not differ significantly from each other at the 0.05 level (after correcting according to Türkiye

vaccinated. Our findings were in good agreement with those reported in other studies [9,20,26-28]. The reason for this may be the spread of negative or inaccurate news heard from the environment or the media. Therefore, population-oriented COVID-19 vaccines must emphasize the high efficacy rates in reducing or eliminating diseases, hospitalizations and deaths, and that accurate, evidence-based information is provided about possible side effects [25,27].

Vaccine hesitancy is a phenomenon influenced by

several factors [28]. In this study, several results related to vaccine hesitancy were obtained. The first was that men's vaccination hesitations were lower than that of women. Similarly, studies have reported that males have lower vaccination hesitations [12,21,25,29,30]. In some studies, the demonstration that COVID-19 complications and mortality rates are higher in men may have led men to vaccination [31,32]. Another factor associated with vaccine hesitancy in this study was the attitude towards the vaccine. Similarly, the results of studies have revealed the

Table 4. Univariate comparison of vaccine hesitancy between the studied variables.

		Vaccine Hesitancy				χ^2	<i>p</i>
		No		Yes			
		n	%	n	%		
Sex	Female (n=1368)	646 _a	47.3	721 _a	52.7	6.405	0.041
	Male (n=561)	337 _a	51.8	313 _b	48.2		
	Not disclosed (n=12)	3 _a	25.0	9 _a	75.0		
Educational status	Primary s. (n=53)	29 _a	54.7	24 _a	45.3	11.654	0.02
	Secondary s. (n=47)	24 _a	51.1	23 _a	48.9		
	High s. (n=717)	317 _a	44.3	399 _b	55.7		
	University (n=1010)	501 _a	49.7	508 _a	50.3		
	Masters (n=204)	115 _a	56.4	89 _b	43.6		
Health perception	Excellent (n=275)	135 _a	49.1	140 _a	50.9	11.119	0.011
	Good (n=1266)	643 _a	50.9	621 _b	49.1		
	Average (n=460)	198 _a	43.0	262 _b	57.0		
	Poor/Very poor (n=30)	10 _a	33.3	20 _a	66.7		
Chronic disease	Yes (n=370)	201 _a	54.3	169 _b	45.7	5.946	0.015
	No (n=1661)	785 _a	47.3	874 _b	52.7		
Flu vaccination in the last year	Yes (n=133)	75 _a	56.8	57 _a	43.2	3.821	0.051
	No (n=1899)	911 _a	48.0	986 _a	52.0		
COVID-19 vaccination	Yes (n=1879)	975 _a	51.9	904 _b	48.1	110.395	<0.001
	No (n=152)	11 _a	7.3	139 _b	92.7		

Each subscript letter denotes a subset of Vaccine hesitancy categories whose column proportions do not differ significantly from each other at the 0.05 level (after Bonferroni correction).

Table 5. Logistic regression computer output.

	B	SE	Wald	<i>p</i>	Exp(B)	95% CI	
						Lower	Upper
Sex (ref. cat.: female n=1367)			4.434	0.109			
Male (n=650)	-0.262	0.127	4.281	0.039	0.77	0.601	0.986
Not disclosed (n=12)	-0.408	0.786	0.269	0.604	0.665	0.143	3.103
Educational status (ref. cat.: primary s.)			3.389	0.495			
Secondary s.	-0.342	0.553	0.383	0.536	0.71	0.24	2.099
High s.	-0.575	0.408	1.989	0.158	0.562	0.253	1.251
University	-0.395	0.402	0.962	0.327	0.674	0.306	1.483
Masters	-0.466	0.435	1.151	0.283	0.627	0.268	1.47
Health perception (ref. cat.: very good)			2.203	0.531			
Good	0.002	0.182	0.000	0.991	1.002	0.701	1.432
Average	0.211	0.213	0.983	0.322	1.235	0.814	1.874
Poor/Very poor	0.222	0.521	0.182	0.67	1.248	0.45	3.463
Chronic disease (present vs. absent)	0.086	0.162	0.283	0.595	1.09	0.794	1.497
Flu vaccination in last year (yes vs. no)	-0.133	0.236	0.318	0.573	0.876	0.552	1.39
ATV-COVID-19 score	-2.527	0.115	485.4	<0.001	0.08	0.064	0.10
Constant	9.393	0.691	184.6	<0.001	12002.4		

Dependent variable: vaccine hesitancy

relationship between people's attitudes towards COVID 19 vaccines and vaccine hesitancy [20,33]. Therefore, it is vital to develop strategies to increase positive attitudes towards vaccines. WHO recommends giving understandable, simple messages emphasizing high confidence in vaccines [34]. It is essential not to ignore the concerns of individuals who express hesitation or reluctance about vaccination [22].

The strength of this study is the inclusion of a high number of participants from seven different geographical regions of Türkiye. However, one weakness is that the study was conducted using an online survey instead of face-to-face interviews due to the COVID-19 outbreak. Consequently, reporting bias must be taken into account. In addition, those who have problems accessing the Internet was not included in the study. This affects the generalizability of the results.

Conclusion

This study showed a high level of vaccine hesitancy due to distrust of COVID-19 vaccines or fear of side effects. In addition, COVID-19 vaccine hesitancy was associated with gender and the level of attitude towards the vaccine. In this context, it may be recommended to organize health trainings containing evidence-based information focusing on the effectiveness of COVID-19 vaccines for the general population by public health nurses and to hang awareness posters about the importance of vaccines in various health institutions (Family Health Centers, Hospitals).

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Conflict of interest

No competing interests to disclose.

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