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# Determination of Individuals' Attitudes Toward COVID-19 Vaccines and Health Fatalism: A Cross-sectional Study from Turkey

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## Abstract

**Background:** Vaccines have positive effects on the course of epidemics. This study was conducted to determine individuals' attitudes toward coronavirus disease-2019 (COVID-19) vaccines, their health fatalism, and factors affecting these.

**Methods:** This cross-sectional study included 944 participants living in Turkey, who were included in the study by snowball sampling, one of the nonprobability random sampling methods. Participant information form, attitudes toward the COVID-19 vaccine scale, and religious health fatalism scale were used to collect the study data. Independent sample t-test, one-way analysis of variance and Pearson correlation analysis were used in the data analysis.

**Results:** Participants had mean positive attitudes toward COVID-19 vaccine score of  $3.63 \pm 1.14$ , mean negative attitudes toward COVID-19 vaccine score of  $3.44 \pm 0.91$ , and mean health fatalism score of  $45.75 \pm 17.43$ . Negative and significant correlations were found between participants' mean health fatalism score and their mean positive attitudes score ( $r = -0.213$ ) and their mean negative attitude score ( $r = -0.362$ ) ( $p < 0.001$ ).

**Conclusions:** Individuals were found to have high positive and low negative attitudes toward COVID-19 vaccines and moderate levels of health fatalism. Individuals with high health fatalism had low positive and high negative attitudes toward COVID-19 vaccines.

**Keywords:** attitude, COVID-19 vaccines, health fatalism

## INTRODUCTION

Epidemics are diseases that occur with an increase in cases in a specific area or community, which spread to a large population and affect society if uncontrolled.<sup>1</sup> COVID-19, which started in Wuhan City, China, in 2019, has spread rapidly worldwide.<sup>2</sup> The COVID-19 pandemic has caused many deaths since its onset and has unprecedented effects on national health systems and the global economy.<sup>3</sup> The rapid transmission and asymptomatic spread of COVID-19 affects human health negatively; therefore, the search and discovery of an effective and safe vaccine have become an urgent global need.<sup>4</sup> Considering the contagious nature of COVID-19, the only sustainable long-term solution is to develop robust vaccine protocols.<sup>5</sup>

A vaccine is an antigenic material that provides the development of adaptive immunity by stimulating the immune system against a pathogen, and it can prevent or reduce mortality and morbidity caused by many infections.<sup>6</sup>

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The World Health Organization stated that vaccines prevent 3.5–5 million deaths from infectious diseases annually.<sup>7</sup> Realizing the inevitability of the spread of the epidemic has greatly accelerated the development of vaccines that can provide primary protection against symptomatic infection, severe clinical presentation, and death.<sup>8</sup> COVID-19 vaccines protect against the current severe symptoms of the disease and are an important tool to reduce virus spread and infection rate.<sup>9</sup> A meta-analysis found that in fully vaccinated populations, the efficacy of the vaccine was 89.1% for severe COVID-19, 97.2% for COVID-19-related hospitalizations, 97.4% for admission to the intensive care unit, and 99% against death.<sup>10</sup> In a similar study, higher vaccine coverage was reported to be associated with lower COVID-19 mortality and incidence rates.<sup>11</sup>

Access to vaccines and acceptance by the vaccinated population are shown as critical components of successful vaccination.<sup>12</sup> Acceptance of vaccination is an outcome behavior that is potentially influenced by various factors and results from a complex decision-making process.<sup>13</sup> Attitudes affect behaviors, and the attitudes of individuals toward vaccination vary widely, which includes supporting, accepting, hesitating, resisting, rejecting, or opposing.<sup>14,15</sup> Even in established vaccination systems, the

reluctance for vaccination is a major barrier to the vaccination of the population.<sup>16</sup> A study conducted in North-Eastern Ethiopia showed that negative attitudes and perceptions about COVID-19 vaccination are important factors to reject vaccination.<sup>17</sup>

Fatalism expresses the belief that everything that happens in life is predetermined, it is not possible to go beyond this predetermination, destiny is governed by an invisible power that will not change whatever a person does, and a person is powerless in the face of inevitable life events.<sup>18</sup> More than 90% of the Turkish population is Muslim, and fatalism is frequently seen in society because the widespread religious belief supports fatalism.<sup>19,20</sup> One of the six pillars of faith in Islam is the belief in fate. In terms of health, fatalism negatively affects various health behaviors and behavioral health determinants.<sup>21</sup> A study of patients with hypertension showed that patients with high fatalistic tendencies had low adherence to treatment.<sup>22</sup> In one study, lower cancer fatalism correlated with higher stool occult blood test intake.<sup>23</sup> Women who thought that cervical cancer occurred because of were three times less likely to have a Pap test than women who did not.<sup>24</sup> Studies have also shown an inverse relationship between fatalistic beliefs and preventive behaviors toward COVID-19.<sup>25,26</sup>

Understanding the factors that shape the attitudes of society toward vaccines will enable planning for evidence-based interventions to increase vaccine intake globally.<sup>27</sup> Studies have evaluated the attitudes of Turkish society toward COVID-19 vaccines<sup>28-30</sup>; however, no studies have evaluated attitudes toward COVID-19 vaccines within the context of health fatalism.

This study was conducted to determine individuals' attitudes toward COVID-19 vaccines, their health fatalism, and the factors affecting these.

## METHODS

### Ethical approval

Permission was taken from the Ministry of Health Scientific Research Platform. The study was approved by the Artvin Çoruh University Ethics Committee (Date: 04.01.2022, No. E-18457941-050.99-34667). Before the study, the participants were given online information about the purpose of the study. Online consent was obtained from the participants before the study. Permission to use the scales (attitudes toward the COVID-19 vaccine scale and religious health fatalism scale) was taken from the original authors. The study was conducted in line with the Declaration of Helsinki.

### Study population and sample

This study was conducted as a cross-sectional study. The study population consisted of individuals aged  $\geq 18$  living in Turkey. The study sample was determined with the

snowball sampling method, one of the nonprobability sampling methods. This method has cost and time advantages but includes non-random selection procedures.<sup>31</sup> The data were collected between January 5 and February 16, 2022. A total of 947 participants filled in the survey; however, since three were filled in by participants aged  $< 18$  years, they were excluded from the analysis, and the study was completed with 944 participants.

In the post-hoc power analysis based on the positive attitude score and health fatalism score, the power of the study was 0.99 at a 95% confidence interval and alpha of 0.05.

### Inclusion criteria

Individuals aged  $\geq 18$  years who did not have reading and comprehension problems and who volunteered to participate in the study were included.

### Data collection tools

The participant information form, attitudes toward the COVID-19 vaccine scale, and religious health fatalism scale were used to collect the study data.

Participant information form: The form, which was prepared by the researchers in line with the literature,<sup>29,32,33</sup> included 15 questions on the sociodemographic characteristics of the participants and their attitudes (COVID-19 vaccines will end the pandemic, recommending COVID-19 vaccines to others, etc.) and perceptions (fear of being infected with COVID-19, having been infected with COVID-19, etc.) toward COVID-19 vaccines and COVID-19.

Attitudes toward the COVID-19 vaccine scale: The scale was developed by Geniş *et al.* to measure attitudes toward COVID-19 vaccines.<sup>34</sup> The scale is a 5-point Likert-type scale (1, strongly disagree; 5, strongly agree) that consists of nine questions. The scale includes two subscales, namely, positive attitudes (1–4 questions) and negative attitudes (5–9 questions). Higher scores in the positive attitude subscale show increased positive attitudes toward COVID-19 vaccines, whereas higher scores in the negative attitude subscale show decreased negative attitudes toward COVID-19 vaccines. The Cronbach alpha value of the scale was 0.96 for the positive subscale, whereas it was 0.78 for the negative subscale and 0.80 in the overall scale.<sup>34</sup> In our study, the Cronbach alpha values were 0.92, 0.82, and 0.89 for the positive subscale, negative subscale, and overall scale.

Religious health fatalism scale: This scale, which was developed by Franklin *et al.* to determine a pattern between health fatalism and preventive health behaviors, consists of 17 items in a 5-point Likert-type scale (1, strongly disagree; 2, disagree; 3, neutral; 4, agree; 5, strongly agree).<sup>35</sup> The validity and reliability study of the scale was conducted by Bobov and Çapık in our country.<sup>36</sup> The scale is scored

between 17 and 85, and higher scores show increased health fatalism. The Cronbach alpha coefficient of the scale was .91, whereas it was 0.96 in the present study.

### Data collection

Study data were collected online through surveys prepared with Google Forms. The prepared survey form was sent to participants online (WhatsApp), and they were asked to fill in the form and share it with people around them. Respondents were prevented from re-entering the survey.

### Data analysis

IBM SPSS Statistics version 23 (IBM Corp., Armonk, NY, USA) was used in data analyses. Data were considered significant at 95% confidence interval and  $p < 0.05$  level. Data were presented as percentage, mean, and standard deviation. Skewness and kurtosis analyses were used in determining the normality distribution of the data. An independent t-test was used to compare normally distributed data with mean positive attitude, negative attitude, and health fatalism scores, whereas one-way analysis of variance and post-hoc tests were used in more than two normally distributed variables. The correlation between participants' age, attitudes toward COVID-19 vaccines, and health fatalism was evaluated by the Pearson correlation analysis.

## RESULTS

The mean age of the participants was  $36.25 \pm 13.13$  (min, 18; max, 75) years, 67.1% were female, 49.5% were living in the city center, 40.8% had an income equal to expense, 52.8% were university graduates, and 23.2% had a chronic disease (Table 1).

Moreover, 91.8% had information about COVID-19 vaccines, and 29.6% of these participants obtained information from healthcare professionals, 91% had COVID-19 vaccination, 81.6% recommended COVID-19 vaccines to others, and 30.2% believed that COVID-19 vaccines will bring the pandemic to an end (Table 1).

In addition, 34.3% of the participants had COVID-19, 66.8% had fears of being infected, and 61% of those who feared the infection had a moderate level of fear and 76.4% followed policies on wearing masks and maintaining a social distance (Table 1).

The participants had mean positive attitude score toward COVID-19 vaccines of  $3.63 \pm 1.14$ , mean negative attitude score toward COVID-19 vaccines of  $3.44 \pm 0.91$ , and mean health fatalism score of  $45.75 \pm 17.43$ .

Significant difference was found between participants' place of residence and their mean positive attitude, negative attitude, and health fatalism scores ( $p < 0.001$ ,  $p < 0.001$ , and  $p < 0.001$ , respectively). The least significant difference (LSD) post-hoc analysis showed that

participants who lived in town/village had lower positive and negative attitude scores and higher health fatalism scores than participants who lived in the city center and town (Table 2).

**TABLE 1.** Characteristics of the participants (N = 944)

Participants' characteristics	N	%
<b>Gender</b>		
Male	311	32.9
Female	633	67.1
<b>Place of residence</b>		
City	467	49.5
District	375	39.7
Town/village	102	10.8
<b>Income status</b>		
Income>expense	176	18.6
Income=expense	385	40.8
Income<expense	383	40.6
<b>Level of education</b>		
Literate	52	5.5
Primary	121	12.8
Middle	64	6.8
High	209	22.1
University	498	52.8
<b>Chronic disease</b>		
Yes	219	23.2
No	725	76.8
<b>Information about COVID-19 vaccine</b>		
Yes	867	91.8
No	77	8.2
<b>Source of information (N = 867)</b>		
Newspaper, Magazine, Book	21	2.4
Internet	285	32.9
Radio, TV	241	27.8
People around	63	7.3
Healthcare professional	257	29.6
<b>Having COVID-19 vaccine</b>		
Yes	859	91.0
No	85	9.0
<b>Recommending COVID-19 vaccine to others</b>		
Yes	770	81.6
No	174	18.4
<b>COVID-19 vaccine will end the pandemic</b>		
Yes	285	30.2
Undecided	398	42.2
No	261	27.6
<b>Having been infected with COVID-19</b>		
Yes	324	34.3
No	620	65.7
<b>Fear of being infected with COVID-19</b>		
Yes	631	66.8
No	313	33.2
<b>Severity of the fear (N = 631)</b>		
Mild	147	23.3
Moderate	385	61.0
Severe	99	15.7
<b>Following the rules of mask and social distance</b>		
Yes	721	76.4
Sometimes	181	19.2
No	42	4.4

**TABLE 2.** Comparison of participants' characteristics and their attitudes toward COVID-19 vaccines and health fatalism (N = 944)

Participants' characteristics	Positive attitude towards vaccine score		Negative attitude towards vaccine score		Health fatalism score	
	Mean ± SD	<i>p</i>	Mean ± SD	<i>p</i>	Mean ± SD	<i>p</i>
<b>Gender</b>						
Male	3.59 ± 1.25	0.489	3.42 ± 1.01	0.705	46.42 ± 18.88	0.305
Female	3.64 ± 1.08		3.45 ± 0.85		45.32 ± 16.67	
<b>Place of residence</b>						
City	3.69 ± 1.16	<b>0.000</b>	3.45 ± 0.92	<b>0.000</b>	41.90 ± 16.89	<b>0.000</b>
District	3.69 ± 1.07		3.52 ± 0.86		48.77 ± 17.02	
Town/village	3.10 ± 1.17		3.07 ± 0.95		52.27 ± 17.36	
<b>Income status</b>						
Income>expense	3.95 ± 1.11	<b>0.000</b>	3.69 ± 0.97	<b>0.000</b>	41.93 ± 16.79	<b>0.000</b>
Income=expense	3.76 ± 1.05		3.55 ± 0.85		44.92 ± 16.46	
Income<expense	3.34 ± 1.18		3.22 ± 0.89		48.33 ± 18.28	
<b>Level of education</b>						
Literate	3.10 ± 1.10	<b>0.000</b>	3.10 ± 0.89	<b>0.000</b>	57.19 ± 16.89	<b>0.000</b>
Primary	3.36 ± 1.16		3.28 ± 0.96		56.49 ± 16.28	
Middle	3.63 ± 1.07		3.35 ± 0.94		51.15 ± 15.34	
High	3.60 ± 1.08		3.38 ± 0.88		46.66 ± 16.06	
University	3.75 ± 1.15		3.55 ± 0.89		40.74 ± 16.52	
<b>Chronic disease</b>						
Yes	3.73 ± 1.08	0.131	3.41 ± 0.91	0.629	45.96 ± 17.92	0.836
No	3.59 ± 1.16		3.45 ± 0.91		45.68 ± 17.29	
<b>Information about COVID-19 vaccine</b>						
Yes	3.71 ± 1.10	<b>0.000</b>	3.49 ± 0.89	<b>0.000</b>	44.77 ± 17.15	<b>0.000</b>
No	2.72 ± 1.20		2.83 ± 0.92		56.29 ± 16.83	
<b>Source of information (N = 867)</b>						
Newspaper, Magazine, Book	3.86 ± 1.36	<b>0.000</b>	3.64 ± 1.07	<b>0.009</b>	40.38 ± 20.08	<b>0.000</b>
Internet	3.55 ± 1.19		3.37 ± 0.92		43.78 ± 18.17	
Radio, TV	3.77 ± 0.97		3.55 ± 0.77		48.04 ± 15.11	
People around	3.39 ± 1.09		3.35 ± 0.95		52.82 ± 19.35	
Healthcare professional	3.90 ± 1.05		3.62 ± 0.90		41.22 ± 15.85	
<b>Having COVID-19 vaccine</b>						
Yes	3.76 ± 1.05	<b>0.000</b>	3.52 ± 0.87	<b>0.000</b>	45.11 ± 17.33	<b>0.000</b>
No	2.22 ± 1.11		2.64 ± 0.86		52.18 ± 17.22	
<b>Recommending COVID-19 vaccine to others</b>						
Yes	3.95 ± 0.91	<b>0.000</b>	3.64 ± 0.81	<b>0.000</b>	44.48 ± 17.10	<b>0.000</b>
No	2.20 ± 0.98		2.57 ± 0.78		51.37 ± 17.79	
<b>COVID-19 vaccine will end the pandemic</b>						
Yes	4.31 ± 0.87	<b>0.000</b>	4.05 ± 0.82	<b>0.009</b>	40.89 ± 17.51	<b>0.000</b>
Undecided	3.70 ± 0.85		3.41 ± 0.72		46.47 ± 15.78	
No	2.75 ± 1.23		2.82 ± 0.83		49.69 ± 18.49	
<b>Having been infected with COVID-19</b>						
Yes	3.47 ± 1.16	<b>0.002</b>	3.38 ± 0.89	0.156	47.32 ± 18.14	<b>0.045</b>
No	3.71 ± 1.12		3.47 ± 0.91		44.93 ± 17.00	
<b>Fear of being infected with COVID-19</b>						
Yes	3.78 ± 1.04	<b>0.000</b>	3.58 ± 0.83	<b>0.000</b>	44.47 ± 17.05	<b>0.001</b>
No	3.31 ± 1.27		3.16 ± 1.00		48.34 ± 17.92	
<b>Severity of the fear (N = 631)</b>						
Mild	3.62 ± 1.23	0.067	3.56 ± 0.88	0.529	45.31 ± 18.82	0.482
Moderate	3.82 ± 0.95		3.57 ± 0.80		44.58 ± 16.28	
Severe	3.90 ± 1.02		3.67 ± 0.84		42.68 ± 17.35	
<b>Following the rules of mask and social distance</b>						
Yes	3.82 ± 1.05	<b>0.000</b>	3.57 ± 0.87	<b>0.000</b>	44.09 ± 16.91	<b>0.000</b>
Sometimes	3.22 ± 1.13		3.14 ± 0.90		49.46 ± 17.72	
No	2.10 ± 1.10		2.49 ± 0.77		58.30 ± 17.70	

**TABLE 3.** Relationship between participants' age, attitudes toward COVID-19 vaccine score, and health fatalism score (N = 944)

Variable	Mean ± SD	Positive attitude towards vaccine score	Negative attitude towards vaccine score	Health fatalism score
Age (min:18, max: 75)	36.25 ± 13.13	$r = -0.025$ $p = 0.435$	$r = -0.014$ $p = 0.677$	$r = 0.125$ <b><math>p = 0.000</math></b>
Positive attitude towards the vaccine score (min:1, max: 5)	3.63 ± 1.14			$r = -0.213$ <b><math>p = 0.000</math></b>
Negative attitude towards the vaccine score (min:1, max: 5)	3.44 ± 0.91			$r = -0.362$ <b><math>p = 0.000</math></b>
Health Fatalism score (min:17, max: 85)	45.75 ± 17.43			

A significant difference was found between participants' income status and their mean positive attitude, negative attitude, and health fatalism scores ( $p < 0.001$ ,  $p < 0.001$ , and  $p < 0.001$ , respectively). Dunnett's C post-hoc analysis showed that participants who had lower income than expense had lower positive attitude and negative attitude scores and higher health fatalism scores than participants who had equal income and expense and those who had income higher than expense.

A significant difference was determined that between participants' level of education and their mean positive attitude, negative attitude, and health fatalism scores ( $p < 0.001$ ,  $p < 0.001$ , and  $p < 0.001$ , respectively). Tukey's post-hoc analysis showed that participants who were literate and primary education graduates had lower positive attitude and negative attitude scores and higher health fatalism scores than participants who were university graduates.

Participants who did not have information about COVID-19 vaccines had significantly low mean positive attitude and negative attitude scores and significantly high mean health fatalism scores ( $p < 0.001$ ,  $p < 0.001$ , and  $p < 0.001$ , respectively). A significant difference was found between participants' source of information about COVID-19 vaccines and their mean positive attitude, negative attitude, and health fatalism scores ( $p < 0.001$ ,  $p < 0.01$ , and  $p < 0.001$ , respectively). Dunnett's C post-hoc analysis discovered that participants who obtained information from individuals around them and the Internet had lower mean positive attitude scores, those who obtained information from the Internet had lower mean negative attitude scores than participants who obtained information from healthcare professionals, and participants who obtained information from the radio, television, and individuals around them had higher mean health fatalism scores.

Participants who did not have COVID-19 vaccination and those who did not recommend COVID-19 vaccines to others had significantly low mean positive attitude and negative attitude scores and significantly high mean health fatalism scores ( $p < 0.001$ ,  $p < 0.001$ , and  $p < 0.001$ , respectively).

Significant difference was found between the participants' "COVID-19 vaccines will put an end to the pandemic" expression and their mean positive attitude, negative attitude, and health fatalism scores ( $p < 0.001$ ,  $p < 0.01$ , and  $p < 0.001$ , respectively). Dunnett's C post-hoc analysis determined that participants who believed that vaccines will not put an end to the pandemic when compared with undecided participants and undecided participants when compared with participants who believed that the pandemic will put an end to the pandemic had lower positive attitude and negative attitude scores and higher health fatalism scores.

Participants who had COVID-19 had significantly low mean positive attitude scores and significantly high mean health fatalism scores ( $p < 0.01$  and  $p < 0.05$ , respectively), and participants who did not have fears of getting infected with COVID-19 had significantly low mean positive attitude and negative attitude scores and significantly high mean health fatalism scores ( $p < 0.001$ ,  $p < 0.001$ , and  $p < 0.01$ , respectively).

A significant difference was found between the participants' state of following policies of wearing masks and social distancing and their mean positive attitude, negative attitude, and health fatalism scores ( $p < 0.001$ ,  $p < 0.001$ , and  $p < 0.001$ , respectively). LSD post-hoc analysis determined that participants who did not follow policies of wearing masks and social distancing when compared with those who sometimes did, and participants who sometimes followed these policies compared with those who followed such policies had lower positive and negative attitude scores and higher health fatalism scores (Table 2).

A positive and significant correlation was found between participants' mean age and their mean health fatalism score ( $r = 0.125$ ;  $p < 0.001$ ). A negative and significant correlation was found between participants' mean health fatalism score and their mean positive attitude score ( $r = -0.213$ ;  $p < 0.001$ ) and their mean negative attitude score ( $r = -0.362$ ;  $p < 0.001$ ) (Table 3).

## DISCUSSION

In this study, the participants had high levels of positive attitudes and low levels of negative attitudes toward COVID-19 vaccines and moderate levels of health fatalism. Individuals with high levels of health fatalism had lower positive attitudes and higher negative attitudes toward COVID-19 vaccines. Healthcare professionals in Turkey had high levels of positive attitudes and low levels of negative attitudes toward COVID-19 vaccines.<sup>28</sup> In a different study conducted in Turkey, levels of negative attitudes toward COVID-19 vaccines were lower than those of positive attitudes.<sup>29</sup> Most citizens in Saudi Arabia and South Korea have been found to have positive attitudes toward COVID-19 vaccines.<sup>16,37</sup> Positive attitudes toward COVID-19 vaccines appear to be promising in decreasing the global COVID-19 burden. Women aged 15 and 49 years in Iğdir had moderate levels of fatalistic tendency.<sup>38</sup> Individuals in east Turkey had high levels of health fatalism.<sup>36</sup> Women in east Turkey were found to have low levels of breast cancer fatalism.<sup>39</sup> A study reported that belief in fatalism increased the possibility of women from Kentucky not to complete HPV vaccine series successfully.<sup>40</sup> Hispanic women with high fatalism similarly had less trust in flu vaccine.<sup>41</sup> Vaccine is important in protecting health, and considering that fatalism negatively affects health behaviors and behavioral health determinants, the results obtained were expected.

Individuals who lived in town/village had low positive attitudes and high negative attitudes toward COVID-19 vaccines and high health fatalism. A study in Bangladesh found that individuals living in rural areas were less likely to accept COVID-19 vaccines than individuals living in cities.<sup>42</sup> In Pakistan, rural people were found to be and refuse to be vaccinated, whereas rural people in Arkansas were more likely to have lower confidence in vaccines than urban residents.<sup>43,44</sup> Women living in rural areas in Mexico were more likely to have Pap smear tests than women living in cities, and they were more likely to believe that the disease was caused by bad luck or fate.<sup>24</sup> Individuals living in rural areas probably have less access to health services, and they have less information about COVID-19 vaccines; thus, they easily attribute their health problems to fate. Negative attitudes and high health fatalism can result from this situation.

Individuals who had lower income than expense had low positive attitudes and high negative attitudes toward COVID-19 vaccines and high health fatalism. Individuals with low annual income in Pakistan expressed a strong distrust toward COVID-19 vaccines.<sup>43</sup> Individuals living in low-income households in England were more likely to reject COVID-19 vaccines.<sup>45</sup> In Italy, the perceived economic difficulty was associated with increased rates of vaccination hesitation.<sup>46</sup> Parents with high income had higher willingness to have their children vaccinated for

COVID-19 than parents with low income.<sup>47</sup> Individuals with lower income than expense in east Turkey had higher health fatalism.<sup>36</sup> In different studies examining prostate cancer fatalism in men and breast cancer fatalism in women, income status did not affect fatalism.<sup>39,48</sup> Individuals with low income probably experience difficulties in receiving health services because of their poor economic status; therefore, they may attribute their health problems to fatalism because of limited health access.

Individuals who were literate and those who had primary education had low positive attitudes and high negative attitudes toward COVID-19 vaccines and had high health fatalism. In a cross-sectional study conducted in Turkey, participants who are undergraduates and had higher levels of education were more likely to have a positive perception toward COVID-19 vaccines.<sup>30</sup> In Italy, parents with low levels of education rejected vaccination.<sup>46</sup> Similarly, studies have shown that individuals with high levels of education had positive beliefs about vaccination<sup>49</sup> and were more willing to be vaccinated.<sup>47,50</sup> Individuals with a low education level probably have less information about the benefits and importance of vaccination and they are less conscious, which may result in a negative attitude. Individuals with low education levels are more fatalistic.<sup>36,39</sup> A study reported that some of the correlation between lower education level and higher health fatalism was attributed to difficulties in their experiences of searching for health information on cancer; therefore, developing interventions that help individuals experience more positive information-seeking experiences may decrease the probability of individuals with lower levels of education to have fatalistic beliefs.<sup>51</sup> In our study, older individuals were found to have higher health fatalism. Similar to the results of our study, as age increased, individuals in east Turkey had increased health fatalism, women in Iğdir had increased fatalistic tendencies, and in a study conducted in four cities in Turkey, men had increased fatalism for prostate cancer.<sup>36,38,48</sup>

In our study, individuals who were not well informed about COVID-19 vaccines had low positive attitudes and high negative attitudes toward COVID-19 vaccines and had high health fatalism. Individuals who obtained information about vaccines from individuals around them and Internet had lower positive attitudes, those who obtained information from the Internet had high levels of negative attitudes, and those who obtained information from radio, TV, and individuals around them had high health fatalism. A study reported that individuals who had sufficient information about vaccine safety and efficiency had more positive attitudes toward COVID-19 vaccines.<sup>52</sup> A study conducted on medical students in India reported that a good awareness about COVID-19 vaccines decreased hesitations about vaccination.<sup>53</sup> Individuals who do not have sufficient information about COVID-19 vaccines probably do not have information about the

disease process and ways to protect them from the disease. They show a fatalistic approach because they do not think that they can interfere with the disease process. Individuals who stated that they would have COVID-19 vaccination did not trust social media sites such as Facebook, Twitter, and Instagram.<sup>54</sup> Individuals in Saudi Arabia who obtained information about COVID-19 from official accounts of the Ministry of Health had higher desires to get vaccinated than individuals who obtained information from other sources such as social media.<sup>55</sup> Incorrect information about coronavirus circulating in social media and other sources can make individuals more fatalistic.<sup>56</sup> Thus, individuals should be informed of correct sources about COVID-19 vaccines. Healthcare professionals are the key point in this regard.

Individuals who did not have COVID-19 vaccination and who did not recommend COVID-19 vaccination to others had low positive attitudes and high negative attitudes toward COVID-19 vaccines and had high health fatalism. Healthcare professionals who were vaccinated showed more positive attitudes toward COVID-19 vaccines.<sup>28</sup> Fatalistic Hispanic women trusted flu vaccine less, and fatalistic women from Kentucky were less likely to complete the HPV vaccine series successfully.<sup>40,41</sup> Parents who recommended COVID-19 vaccination to others were more willing to allow their children to get vaccinated against COVID-19 than parents who did not make such recommendations to others.<sup>47</sup> Healthcare professionals who recommended COVID-19 vaccines to others were more willing to have COVID-19 vaccination.<sup>32</sup> Attitudes affect behaviors.<sup>15</sup> Negative attitudes have negative reflections on behaviors of getting vaccinated. There is a certain predetermination in fatalism belief, and no matter what one does, this would not change.<sup>18</sup> Individuals may have avoided vaccination because they thought that they will not get rid of the disease even if they were vaccinated. Health fatalism should be decreased to increase vaccination.

Individuals who believed that COVID-19 vaccination will not end the pandemic had low positive attitudes and high negative attitudes toward COVID-19 vaccines and had high health fatalism. The only long-term sustainable solution for COVID-19 is to develop robust vaccination protocols.<sup>5</sup> In Holland, the strongest determinant of the intention to get vaccinated was the belief that the COVID-19 crisis will end only if a large number of individuals are vaccinated.<sup>57</sup> Healthcare professionals who believed that vaccines can end the pandemic were more willing to get vaccinated.<sup>32</sup> Moreover, 44.1% of the healthcare professionals in northeast Ethiopia stated that decreasing the incidence of COVID-19 without vaccines is not possible.<sup>17</sup> In fatalism, everything is predetermined,<sup>18</sup> and fatalistic individuals believe that the end of the pandemic is predetermined. Therefore, they may be thinking that vaccines will not end the pandemic.

Individuals who had COVID-19 had low positive attitudes toward COVID-19 vaccination and had high health fatalism. Those who did not fear contracting COVID-19 had low positive attitudes and high negative attitudes toward COVID-19 vaccines and had high health fatalism. In Saudi Arabia, individuals who did not have COVID-19 previously were more likely to accept COVID-19 vaccination.<sup>55</sup> In another study, individuals who had high fears of contracting COVID-19 were more likely to show positive attitudes toward vaccines.<sup>29</sup> In Arkansas, individuals who were not afraid of or a bit afraid of COVID-19 were more likely to hesitate COVID-19 vaccination than individuals who were afraid of COVID-19.<sup>44</sup> Individuals who had COVID-19 probably thought that they have antibodies and therefore may have lower attitudes toward vaccines. A study conducted in different cities in Turkey showed that fatalistic attitudes decreased fear of COVID-19.<sup>58</sup> A fatalistic life attitudes helps individuals accept the disease process better and therefore experience less fear and anxiety.<sup>59</sup> Individuals who do not fear COVID-19 probably think that they will be infected no matter what and therefore not scared.

Individuals who did not follow the policies on wearing masks and social distancing had low positive attitudes and high negative attitudes toward COVID-19 vaccines and had high health fatalism. Measures such as hand washing, wearing mask, and social distancing contribute to the slowing of the pandemic.<sup>60</sup> In parallel with our study, individuals who did not plan to get vaccinated in Canada were less likely to wear face masks and apply physical distancing.<sup>61</sup> Individuals who wore masks and paid attention to social distancing tended to have vaccination.<sup>62</sup> Following the policies of social distancing and wearing mask has positive effects on the pandemic, just like vaccines. Individuals with high negative attitudes toward vaccines do not obey mask-wearing and social-distancing rules. Inverse proportion was found between fatalistic beliefs and COVID-19-related preventive behaviors.<sup>25</sup> Fatalistic individuals were less willing to obey social distancing rules.<sup>26</sup> Fatalistic individuals may think that they cannot escape the disease, which could affect their approaches to vaccines and personal protective measures.

The results of this first study, in which the attitudes toward COVID-19 vaccines in Turkey were evaluated in the context of health fatalism, are important, and we suggest repeating the study with different samples.

The use of the snowball sampling model, which is one of the improbable random sampling methods, is an important study limitation. Thus, participants may not have been randomly included in the sampling because the data collection process could not be controlled. In addition, the study only enrolled 944 participants; therefore, the results cannot be generalized to the whole Turkish society.



## CONCLUSIONS

In our study, individuals had high levels of positive attitudes and low levels of negative attitudes toward COVID-19 vaccines and moderate levels of health fatalism. Individuals with high levels of health fatalism had lower positive attitudes and higher negative attitudes toward COVID-19 vaccines. Therefore, healthcare professionals should inform the society about COVID-19 vaccines, benefits of vaccines, and their effects on the pandemic.

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## CONFLICT OF INTEREST

The authors declare no potential conflicts of interests with respect to the authorship and/or publication of this article.

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