COVID-19 VACCINE HESITANCY IN TURKEY: CONSPIRACY BELIEFS, FEAR AND STRESS

Mine Aydemir-Dev – Onur Barca – Nuran Bayram-Arli – Veysel Bozkurt[1]

ABSTRACT: *The aim of this study is to examine factors associated with COVID-19 vaccine hesitancy. An online survey was conducted to collect the data to be evaluated. The survey included demographic questions and four scales: vaccine hesitancy, fear of COVID-19, stress, and vaccine conspiracy beliefs. Four hundred and ninety-six people answered the survey in Turkey. A conceptual model was established and estimated with a structural equation model to explore the relationships. The findings identified a statistically significant direct effect on vaccine hesitancy of conspiracy beliefs, fear, and stress. Accordingly, it was concluded that individuals with a firm belief in vaccine conspiracies, high stress levels, and low fear of COVID-19 had high levels of vaccine hesitancy. This article suggests the importance of public access to accurate information and low stress levels.*

KEYWORDS: *COVID-19, vaccine hesitancy, vaccine conspiracy beliefs, fear, stress, Turkey*

INTRODUCTION

The COVID-19 virus, which entered our lives in the last month of 2019, continues to affect our lives and remains important. Although a method that will completely terminate and eliminate the virus has not yet been found, vaccine

1 *Mine Aydemir-Dev* is at Bursa Uludağ University, Faculty of Economics and Administrative Sciences, Bursa, Turkey, email address: mineaydemir@uludag.edu.tr. *Onur Barca* is at Bursa Uludağ University, Faculty of Economics and Administrative Sciences, email address: onurbarca@uludag.edu.tr. *Nuran Bayram-Arlı* is at Bursa Uludağ University, Faculty of Economics and Administrative Sciences; email address: nuranb@uludag.edu.tr. *Veysel Bozkurt* is at İstanbul University, Faculty of Economics, İstanbul, Turkey: Istanbul, Turkey; email address: vbozkurt@istanbul.edu.tr.

production has started as a result of many studies. During the earlier COVID-19 period, options such as herd immunity were also considered; however, the severe increase in the number of deaths and the increase in hospital occupancy rates led to an acceleration of vaccine-related studies. Serious measures such as lockdowns have been implemented to prevent an increase in cases, especially in countries with large populations. However, these measures have caused many other problems, primarily economic ones (Đorđević et al. 2021). Vaccination has been considered the best method for enabling the continuation of normal life and lessening the number of people affected by the virus. Vaccination is beneficial, particularly in two areas: first, vaccines enable easy recovery from the disease, and second, they reduce contagion, or in other words, they reduce the spread of the virus (Bendau et al. 2021). For a vaccine to work, especially in regard to these aspects, it is important that the majority of the population can and is willing to be vaccinated. The problem encountered at this point is that people delay vaccination or decide not to be vaccinated due to their hesitation about the process. Even delays caused by vaccine hesitancy can result in the spread of the virus, threatening the lives of more people. Thus, it is important to determine the factors that cause vaccine hesitancy so that we can come up with policies to increase vaccine acceptance and make timely interventions.

Since COVID-19 vaccines are new developments, people have been very worried about their potential side effects and harms. While the vaccination process was going on, people had the opportunity to observe others who were vaccinated and thus gained insight into the effects of the vaccines. The present study was conducted in the final month of 2021 and focused on revealing the factors that influence the vaccine hesitation of people with insight into the vaccination process since the beginning of the pandemic. At the same time, studies carried out in different countries with different cultures can provide different perspectives and findings, enabling the concept of vaccine hesitancy to be understood and leading to better policies and strategies. By carrying out the study in a different geographical region, we aim to contribute to the literature on vaccine hesitancy.

VACCINE HESITANCY AND ASSOCIATED FACTORS

Vaccination is one of the most important means of protecting public health. Even before the COVID-19 pandemic, vaccine hesitancy was perceived as a health threat (Geoghegan et al. 2020). The reasons why people hesitate or refuse to be vaccinated are complex and known to vary culturally and geographically

(ibid.; Larson et al. 2014). At the same time, debates on the subject of vaccines and health have a repetitive nature (Yu et al. 2021).

When looking for an answer to why people hesitate to get vaccinated, information, beliefs, and conspiracy theories about the subject come to mind (Oleksy et al. 2021). Side effects and the rapid development of vaccines are among the most commonly known causes of vaccine hesitancy (Geoghegan et al. 2020; Palamenghi et al. 2020). One of the studies on this subject, Geoghegan et al. (2020), states that people's concerns stem from misinformation (the idea that vaccines cause different diseases, vaccines are not adequately tested, etc.).

Even before the outbreak of COVID-19, Turkey was a country with a widespread conspiracy culture. As a matter of fact, a study conducted immediately after the emergence of the COVID-19 pandemic revealed that 34% of society saw COVID-19 as a conspiracy led by the great powers. In comparison, 41% believed the virus was generated in a laboratory (Sayın–Bozkurt 2021). Increasing uncertainty and anxiety as the pandemic continued led to a psychosocial atmosphere suitable for the emergence of conspiracy theories. Even after the invention of relevant vaccines, most of those who saw COVID-19 as a conspiracy joined the ranks of anti-vaxxers or the undecided. Individuals' conspiracy beliefs (theories) about vaccines became one of the most significant obstacles to getting vaccinated against the COVID-19 virus. In other words, individuals do not want to be vaccinated because they believe in conspiracy theories. Conspiracy beliefs affect fear and trust, influencing people's decisions about taking precautions and having medical care, and may cause them to adopt a negative attitude toward vaccines. The academic literature reveals the existence of a positive and significant relationship between conspiracy beliefs and vaccine hesitancy (de Sousa et al. 2021; Jolley–Douglas 2014; Malik et al. 2020).

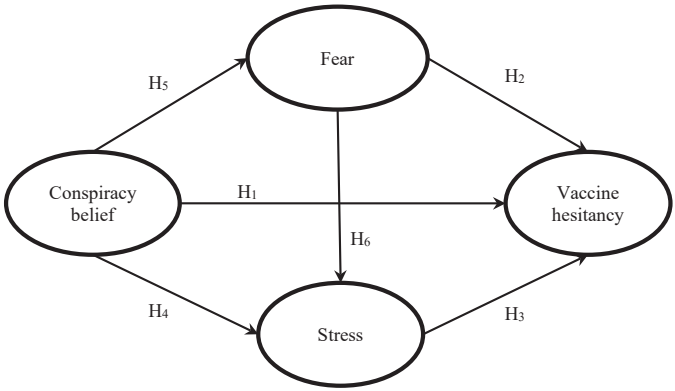
With COVID-19, the fear of death and anxiety of contracting the virus or losing loved ones greatly increased. According to a study conducted by the Ministry of Health Social Sciences Board (Ataman et al. 2021) in Turkey, 40% of 4,275 respondents reported an increase in anxiety involving fear of death, while 51% indicated increased anxiety about contracting the virus, and 79% said they were more worried about losing their loved ones. Increasing uncertainty, fear, and anxiety significantly affected vaccine hesitancy. Studies have consistently reported that a higher perceived disease severity or fear of disease is associated with less vaccine hesitancy (Huang–Zhao 2020; Karlsson et al. 2021). It is thought that the fear of COVID-19 reduces vaccine hesitancy and leads people to get vaccinated. The studies conducted by Moore et al. (2021), Bendau et al. (2021), and Hwang et al. (2021) revealed that there is a negative relationship between the fear of catching COVID-19 and hesitancy about getting vaccinated.

The pandemic period changed people's lifestyles. Decreased employment opportunities and physical distance increased feelings of loneliness, future anxiety, and stress levels. It is known that all kinds of threatening stimuli perceived by individuals concerning their physical and mental integrity cause stress (Scheier–Carver 1987). Furthermore, the impact of the pandemic has been much more severe on females, youth, and people with low incomes (de Sousa et al. 2021). This study focuses on the stress caused by COVID-19 and examines its effect on vaccine hesitancy. Stress may increase vaccine hesitancy (Simione et al. 2021). The literature shows a positive relationship between vaccine hesitancy and stress (de Sousa et al. 2021; Palgi et al. 2021). A positive relationship has also been found between fear of COVID-19 as another variable and stress (Artan et al. 2021; Bakioglu et al. 2021; Mertens et al. 2020). Finally, there is uncertainty about whether there is a relationship between stress and belief in conspiracy theories. While some studies (Constantinou et al. 2021; Simione et al. 2021; Swami et al. 2016) found a positive and significant relationship, some studies (Ferreira et al. 2022; Georgiou et al. 2020) found no significant relationship (Williams et al. 2022).

Based on this information, the following hypotheses were formed within the scope of the research:

H_1: Conspiracy beliefs positively affect vaccine hesitancy.
H_2: Fear of COVID-19 negatively affects vaccine hesitancy.
H_3: COVID-19-related stress levels positively affect vaccine hesitancy.
H_4: Conspiracy beliefs affect COVID-19-related stress levels positively.
H_5: Conspiracy beliefs affect fear of COVID-19 positively.
H_6: Fear of COVID-19 affects COVID-19-related stress levels positively.

Figure 1. *Conceptual model*



Source: Author's illustration.

Figure 1 shows the conceptual model, where each arrow points to a hypothesis. Except for the effect of the fear of COVID-19 on vaccine hesitancy, the signs of all hypotheses are positive.

METHODOLOGY

Participants

A survey was conducted with 496 participants in Turkey. The data were collected in December 2021 using an internet-based self-reporting survey delivered in Turkish via the convenience sampling method. The study was approved by the ethics committee of Bursa Uludağ University (2021/10). Participants were between 18 and 76 (Mean=34.34 years, S.D.=12.6). Almost half (44%) were female.

Measures

A questionnaire was used to collect data in the study. In addition to socio-demographic information, the survey included four scales: a COVID-19 Vaccine Hesitancy Scale, a Fear of COVID-19 Scale, a COVID-19 Vaccine Conspiracy Beliefs Scale, and a COVID-19 Stress Scale. All of these scales were adapted to Turkish literature by the authors. In order to ensure linguistic and conceptual equivalence for all scales (except the Fear of COVID-19 Scale), back-translations into Turkish and English were made by two experts. In addition, another bilingual expert translated the first version of the translations into English, and comparisons were made (Marsella–Leong 1995). Then, a pre-test (N=30) was performed to determine whether all scales were readable and understandable.

COVID-19 Vaccine Hesitancy Scale (VHS): To measure COVID-19 vaccine hesitancy, we used six items in line with relevant studies (see Larson et al. 2015; Luyten et al. 2019; Shapiro et al. 2018). These included "COVID-19 vaccines are important for my health" and "COVID-19 vaccines are effective" among the sample items. The items in the scale used a five-point Likert scale with "1 – strongly agree" and "5 – strongly disagree." High scores indicate a high level of vaccine hesitancy. In our study, we obtained a Cronbach's alpha (CA) value of 0.95, a composite reliability (CR) value of 0.95, and an average variance extracted (AVE) value of 0.75.

Fear of COVID-19 Scale (FCS): The Fear of COVID-19 Scale developed by Ahorsu et al. (2022) was used to measure respondents' fear of COVID-19. The

scale, adapted to Turkish literature by Artan et al. (2021), consists of seven items. "I am most afraid of COVID-19" and "It makes me uncomfortable to think about COVID-19" are among the sample items (Ahorsu et al. 2022). The items in the scale used a five-point Likert scale with "1 – strongly disagree" and "5 – strongly agree." High scores indicate a high level of fear of COVID-19. The Cronbach's alpha internal consistency coefficient of the original scale was found to be 0.82 (ibid.). The scale was structured in two dimensions in our study, as in the study by Chi et al. (2022). The dimensions are named the same as in Chi et al.'s (2022) study: fear-related thoughts (four items) and physical response (three items). In our study, we obtained CA values of 0.86 and 0.88 in each dimension, CR values of 0.88 and 0.92 in each dimension, and AVE values of 0.65 and 0.80 in each dimension, respectively. We found a maximum shared squared variance (MSV) value of 0.45 and an average shared squared variance (ASV) value of 0.45.

COVID-19 Vaccine Conspiracy Belief Scale (VCBS): We used five items, following relevant studies, to measure COVID-19 vaccine conspiracy belief (Su et al. 2021; Winter et al. 2022). "COVID-19 is an artificial virus rather than a virus due to natural reasons," "COVID-19 is the product of powerful organizations," and "The dissemination of COVID-19 is due to a virus leak in a laboratory" are among the sample items (Su et al. 2021; Winter et al. 2022). The items in the scale used a five-point Likert scale with "1 – strongly disagree" and "5 – strongly agree." High scores indicate a strong belief in vaccine conspiracy. Our study obtained a CA value of 0.95, a CR value of 0.94, and an AVE value of 0.76.

COVID-19 Stress Scale (CSS): To determine the COVID-19-related stress levels of the participants, we used the COVID-19 Stress Scale that was developed by Taylor et al. (2020). The scale consists of six items. "I had trouble concentrating because I kept thinking about COVID-19," "Disturbing mental images about COVID-19 popped into my mind against my will," and "I had trouble sleeping because I was worried about COVID-19" are among the sample items. Items were rated on a five-point scale ranging from "0 – never" to "4 – almost always." High scores indicate high COVID-19-related stress levels. The Cronbach's alpha internal consistency coefficient of the scale was found to be 0.93 for two samples (ibid.). Our study obtained a CA value of 0.90, a CR value of 0.90, and an AVE value of 0.60.

Data analysis

IBM SPSS Statistics, AMOS version 26, and R Studio (RStudio Team 2016) were used for the analyses. In the study, we performed exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) for all scales. We calculated Cronbach's alpha and composite reliability for reliability and

average variance extracted for convergent validity. For discriminant validity, we calculated the maximum shared squared variance and the average shared squared variance. Finally, we used structural equation modeling to determine the effect of variables on vaccine hesitancy.

FINDINGS

A total of 496 people participated in the research. Twenty-four percent of the participants had already contracted COVID-19, and 76% had not. Ninety-one percent of these individuals were vaccinated, 6% were not, and 3% stated they did not intend to be vaccinated. The most influential factor in getting vaccinated was their own decision (45%), then health authorities (23%), and other options (fear of COVID-19, family, social environment). Seventy-one percent of the participants stated their health status was good. Descriptive statistics about the participants are presented in Table 1.

Table 1. *Descriptive statistics*

Demographic	N	%
Gender		
Female	278	56
Male	218	44
Marital status		
Single	270	54
Married	226	46
Education level		
Secondary education or less	58	12
Higher education	438	88
Economic situation		
I can only meet my basic needs	134	27
I can meet little more than basic needs	189	38
I can easily meet all my needs	173	35
Had COVID-19		
Yes	117	24
No	379	76

Demographic	N	%
Vaccination status		
Yes	454	91
No	29	6
No think	13	3
Most influential factor in vaccination decision		
Family	44	9
Social environment	36	7
Health authorities	114	23
Fear of COVID-19	48	10
Own decision	224	45
I'm not vaccinated	30	6

Source: Author's calculations.

Fifty-six percent of the participants were male, 88% were higher education graduates, and 54% were single. The participants of the study were between 18 and 76 years old. The mean age was 34.34 (±12.6). In addition, concerning the answers to respondents' perception of their economic situation, 27% stated that they could only meet their basic needs. The proportion of those who could meet all their needs easily is 35%.

At this stage of the study, the validity and reliability of the scales used in the study were examined. For this purpose, exploratory factor analysis and confirmatory factor analysis were applied, and goodness of fit indices and reliability results were reported (Table 2.).

Regarding communality, the value for the Vaccine Hesitancy Scale varied between 0.73 and 0.83, and the resulting variance value of the scale was 79.55% for one dimension. For the Vaccine Hesitancy Scale, EFA values ranged from 0.896 to 0.916, and CFA values ranged from 0.787 to 0.914. For the Fear of COVID-19 Scale, communalities values ranged between 0.68 and 0.87, and the resulting variance value of the scale was 76.33% for the two dimensions. The correlation between the two dimensions in the scale was found to be 0.67. For the Fear of COVID-19 Scale, EFA values ranged from 0.714 to 0.916, and CFA values ranged from 0.747 to 0.959.

Table 2. *Exploratory and confirmatory factor analysis – results for Vaccine Hesitancy Scale and Fear of COVID-19 Scale*

COVID-19 Vaccine Hesitancy Scale			Fear of COVID-19 Scale				
	Factor loadings			Factor loading EFA		Factor loading CFA	
Items	EFA	CFA	Items	Fear thoughts	Physical response	Fear thoughts	Physical response
VHS1	0.912	0.914	FCS1	0.770		0.777	
VHS2	0.916	0.912	FCS2	0.868		0.747	
VHS3	0.908	0.901	FCS3	0.714		0.787	
VHS4		0.787	FCS4	0.805		0.812	
VHS5		0.797	FCS5		0.825		0.940
VHS6		0.868	FCS6		0.916		0.790
			FCS7		0.828		0.959
KMO=0.92; Chi-Square: 2831.203; df:15; p<0.000			KMO=0.869; Chi-Square: 2054.042; df:21; p<0.000				

Source: Author's calculation.
Note: Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

Values for communalities for the Vaccine Conspiracy Belief Scale ranged between 0.71 and 0.91, and the resulting variance value of the scale was 81.93% for one dimension (Table 3.). For the Vaccine Conspiracy Belief Scale, EFA values ranged from 0.843 to 0.952, and CFA values ranged from 0.771 to 0.979. The COVID-19 Stress Scale communality values ranged between 0.56 and 0.79, and the resulting variance value of the scale was 67.74% for one dimension. The COVID-19 Stress Scale had EFA values ranging from 0.745 to 0.889, and CFA values ranging from 0.635 to 0.909.

Table 3. *Exploratory and confirmatory factor analyses – results for Vaccine Conspiracy Belief Scale and COVID-19 Stress Scale*

COVID-19 Vaccine Conspiracy Belief Scale			COVID-19 Stress Scale		
	Factor loading			Factor loading	
Items	EFA	CFA	Items	EFA	CFA
VCBS1	0.911	0.864	CSS1	0.745	0.635
VCBS2	0.843	0.771	CSS2	0.835	0.757
VCBS3	0.952	0.979	CSS3	0.889	0.909
VCBS4	0.900	0.856	CSS4	0.793	0.730
VCBS5	0.916	0.876	CSS5	0.862	0.833
			CSS6	0.806	0.742
KMO=0.885; Chi-Square: 2485.116; df:10; p<0.000			KMO=0.889; Chi-Square: 1871.276; df:15; p<0.000		

Source: Author's calculation.
Note(s): Extraction method: principal component analysis. Rotation method: varimax with Kaiser normalization.

The goodness of fit indices obtained for the scales are summarized in Table 4. According to these results, all scales' goodness of fit indices showed a good fit.

Table 4. *Goodness of fit indices for scales for confirmatory factor analysis*

Scales	X2/df	df	P	GFI	TLI	IFI	CFI	RMSEA	SRMR
VHC	2.659	8	0.006	0.99	0.99	0.99	0.99	0.05	0.01
FCS	2.632	11	0.002	0.97	0.97	0.98	0.96	0.07	0.03
VCBS	1.122	3	0.339	0.99	1.00	1.00	1.00	0.02	0.00
CSS	3.823	7	0.000	0.98	0.99	0.99	0.99	0.07	0.02
Acceptable level	≤ 5			≥ 0.90	≥ 0.90	≥ 0.90	≥ 0.90	≤ 0.08	≤ 0.10

Source: Author's calculation.
Note: Goodness of Fit Index (GFI); Tucker-Lewis Index (TLI); Bollen's Incremental Fit Index (IFI); Comparative Fit Index (CFI); Root mean square error of approximation (RMSEA); Standardized root mean square residual (SRMR). Acceptance levels were taken from Hu–Bentler (1999), Byrne (2010).

The CA and CR values, which examine the reliability of the scales, are shown in Table 5. Both values are required to be greater than 0.70. This result shows that the scale items are internally consistent. The results show that all scales have good internal consistency. In addition, all of the calculated AVE values were above 0.50, and the CR > AVE condition was met. This result shows that the scales ensured convergent validity. MSV and ASV values calculated for the Fear of COVID-19 Scale, which is its sub-dimension, were also compared with the AVE, and both values met the condition of being less than AVE.

Table 5. *Values of reliability, convergent, and discriminant validity*

Scales		Items	Mean	SD	CA	CR	AVE	MSV	ASV
Vaccine Hesitancy Scale		6	13.83	6.07	0.95	0.95	0.75		
Fear of COVID-19 Scale	Fear thoughts	4	11.01	4.43	0.86	0.88	0.65	0.45	0.45
	Physical response	3	5.26	2.62	0.88	0.92	0.80		
Vaccine Conspiracy Beliefs Scale		5	15.09	5.39	0.95	0.94	0.76		
COVID-19 Stress Scale		6	4.11	4.50	0.90	0.90	0.60		

Source: Author's calculation.
Note: CA: Cronbach's alpha; CR: composite reliability; AVE: average variance extracted; MSV: maximum shared squared variance; ASV: average shared squared variance.

The estimates for the regression coefficients as a result of the estimated structural equation model are presented in Table 6. The Chi-square test statistic of the model was 304,437 (df: 141; $p<0.000$ and $X^2/df=2.159$).

When the regression model was examined, the path between vaccine conspiracy belief and COVID-19 stress was not found to be statistically significant ($\beta=-0.014$; $p>0.05$). Fear of COVID-19 had a significant negative effect on vaccine hesitancy ($\beta=-0.445$; $p<0.01$); thus, the greater the fear associated with COVID-19, the less vaccine hesitancy there was. Vaccine hesitancy was significantly, directly, and positively related to vaccine conspiracy belief and COVID-19-related stress ($\beta=0.145$; $p<0.05$ and $\beta=0.288$; $p<0.01$, respectively). This shows that vaccine hesitancy is strong when individuals' vaccine conspiracy beliefs are firm and when COVID-19-related stress is high. The findings revealed that the perceived fear of COVID-19 has a significantly direct, positive, and powerful influence on COVID-19 stress ($\beta=0.668$; $p<0.01$). This shows that individuals with a strong fear of COVID-19 also had high COVID-19 stress levels. In addition, the

regression coefficient between vaccine conspiracy belief and fear of COVID-19 was found to be statistically significant. It was found that the belief in a vaccine conspiracy directly and positively affected fear of COVID-19 (β=0.103; $p<0.05$). Accordingly, it was concluded that individuals with a strong vaccine conspiracy belief also had a stronger fear of COVID-19.

Table 6. *Regression coefficients*

						95% Conf. interval		Standard
Predictor	Outcome	Estimate	S. E.	z-value	p	Lower	Upper	estimate
VCBS	FCS	0.093	0.047	1.991	0.047	0.001	0.185	0.103
	CSS	–0.010	0.031	–0.326	0.745	–0.071	0.051	–0.014
FCS	CSS	0.547	0.061	9.017	0.000	0.428	0.666	0.668
	VHS	–0.513	0.112	–4.579	0.000	–0.732	–0.293	–0.445
VCBS	VHS	0.151	0.059	2.563	0.010	0.035	0.266	0.145
CSS	VHS	0.404	0.136	2.981	0.003	0.139	0.670	0.288

Source: Author's calculation.
Note: VHS: Vaccine Hesitancy Scale; VCBS: Vaccine Conspiracy Belief Scale; FCS: Fear of COVID-19 Scale; CSS: COVID-19 Stress Scale.

The established regression models show R^2=0.123 for vaccine hesitancy, R^2=0.01 for fear of COVID-19, and R^2=0.444 for COVID-19 stress. As much as 12.3% of the total change in vaccine hesitancy is explained by belief in vaccine conspiracy, fear of COVID-19, and COVID-19-related stress. Moreover, 44.4% of the total change in COVID-19 stress is explained by belief in a vaccine conspiracy and fear of COVID-19.

Table 7. *Goodness of fit indices for scales for SEM*

Index	Value	Acceptable level
Comparative Fit Index (CFI)	0.974	≥ 0.90
Tucker–Lewis Index (TLI)	0.968	≥ 0.90
Bollen's Incremental Fit Index (IFI)	0.974	≥ 0.90
Goodness of Fit Index (GFI)	0.930	≥ 0.90
Standardized root mean square residual (SRMR)	0.044	≤ 0.10
Root mean square error of approximation (RMSEA)	0.054	≤ 0.08

Source: Author's calculation.

The goodness of fit indices obtained for the structural equation model are summarized in Table 7. According to the results in this table, the model had a good fit. Supported and unsupported hypotheses are also summarized in Table 8.

Table 8. *Results of hypotheses*

Pathways	Results
Vaccine conspiracy belief → Vaccine hesitancy	Supported
Fear of COVID-19 → Vaccine hesitancy belief	Supported
Vaccine conspiracy belief → Fear of COVID-19	Supported
Vaccine conspiracy belief → COVID-19 stress	Not supported
COVID-19 stress → Vaccine hesitancy belief	Supported
Fear of COVID-19 → COVID-19 stress	Supported

Source: Author's construction.

All hypotheses were supported except for the hypothesis that "COVID-19 stress has a positive effect on vaccine conspiracy belief." Furthermore, fear of COVID-19 played a mediating role in the relationship between vaccine conspiracy beliefs and vaccine hesitancy. The standardized indirect effect was 0.19.

CONCLUSION

Within the scope of this research, a survey was conducted on adults' opinions about COVID-19 vaccines. The factors affecting vaccine hesitancy were revealed, and the direct and indirect relationships were examined. The findings aim to contribute to a better understanding of vaccine hesitancy and improve policies and strategies. There are many studies in the literature on concepts such as vaccine hesitancy, vaccine volunteering, etc. In addition, many studies have been carried out on COVID-19 vaccines during the pandemic. The findings of this study correspond to the results obtained from the literature.

When the relationship between conspiracy beliefs and vaccine hesitancy was examined, it was found that conspiracy beliefs positively and significantly affected vaccine hesitancy in the model estimated within the scope of this study. In their study, Salali and Uysal (2020) found a strong positive association between belief in COVID-19 conspiracies and general hesitancy about vaccines across three countries (USA, UK, and Turkey). De Sousa et al. (2021) concluded

that vaccine-related conspiracy beliefs positively and strongly influence vaccine hesitancy (not receiving or delaying the vaccine). Similarly, Jennings et al. (2021) found a positive significant relationship between conspiracy beliefs and vaccine hesitancy. Akther and Nur (2022) concluded that conspiracy beliefs negatively affect vaccine acceptance.

As a result of this study, it was found that fear of COVID-19 has a negative and significant effect on vaccine hesitancy. Moore et al. (2021) studied vaccine hesitancy and found a negative relationship between fear of contracting COVID-19 and vaccine hesitancy. Bendau et al. (2021) found a significant positive relationship between fear of COVID-19 and voluntary vaccination. Hwang et al. (2021) reported in their study that higher perceived disease severity or fear was associated with a weak propensity to vaccine hesitancy.

Regarding the relationship between conspiracy beliefs and fear of COVID-19, the study found that conspiracy beliefs positively and significantly affect the fear of COVID-19. Naveed et al. (2021) found a positive and significant relationship between conspiracy beliefs and fear of COVID-19.

Another relationship examined within the scope of the study is that between COVID-19-related stress and vaccine hesitancy. As known, stress is a concept that can be associated with several variables. Within the scope of this study, it was found that COVID-19-related stress affects vaccine hesitancy positively and significantly. An increase in stress may cause an increase in vaccine hesitancy. This result is supported by the results obtained in the study of de Sousa et al. (2021). De Sousa et al. (2021) showed that there is a positive and significant relationship between perceived stress and vaccine hesitancy. This result is very important, especially in relation to the pandemic process and at the point of policymaking. It is naturally inevitable that people are stressed in a pandemic environment. However, a high level of stress affects the decision-making process. As the results of this study show, high stress levels increase vaccine hesitancy. People with high stress levels have a negative view of vaccination, and their hesitancy about vaccination increases. This result shows that creating policies that help people stay calm and do not increase their stress levels in a pandemic environment can make it easier for people to accept the vaccine.

Another finding obtained from the estimated model in the study is the relationship between fear of COVID-19 and COVID-19 stress. As expected, this relationship is positive. Fear of COVID-19 affects COVID-19-related stress in a positive and significant way. On the other hand, Bakioglu et al. (2021) found a significant positive relationship between fear of COVID-19 and depression anxiety stress (DAS). Abid et al. (2021) found a significant positive relationship between fear of COVID-19 and stress. Similarly, in the studies conducted

by Peker and Cengiz (2021) and Lathabhavan (2021), a significant positive relationship was identified between fear of COVID-19 and perceived stress.

The only path that turns out to be insignificant in the estimated structural equation model is from conspiracy beliefs to stress. As stated in the hypothesis, a positive relationship between conspiracy beliefs and stress is expected to exist. However, while some studies (Constantinou et al. 2021; Simione et al. 2021; Swami et al. 2016; Williams et al. 2022) found a significant positive relationship, other studies (Ferreira et al. 2022; Georgiou et al. 2020) could not find a significant relationship. In the model estimated in this study, the effect of conspiracy beliefs on stress was found to be insignificant. The fact that many individuals who claim that COVID-19 is a conspiracy do not believe in COVID-19 may have caused the failure to find a significant relationship between belief in conspiracy theories and stress (Garan et al. 2021). Therefore, the direct effect of conspiracy beliefs on fear and vaccine hesitancy and the direct effect of stress on vaccine hesitancy was found to be significant. In contrast, the direct effect of conspiracy beliefs on stress was not significant. In addition to the direct effect of conspiracy beliefs on vaccine hesitancy, there is also an indirect effect through fear.

Obtained with the help of the estimated model, these results provided an opportunity to examine the relationships between the variables associated with vaccine hesitancy as a whole. Conspiracy beliefs have been shown to affect increasing vaccine hesitancy and fear of COVID-19. It has been concluded that fear of COVID-19 increases stress levels, and high stress increases vaccine hesitancy. These results reveal the importance of taking into account conspiracy beliefs, stress, and fear levels when drawing up policies to address vaccine hesitancy. Reducing people's stress levels and conspiracy beliefs will also reduce vaccine hesitancy. In other words, people with less inclination to believe in conspiracies and low-stress levels are more likely to get vaccinated. On the other hand, people with a strong fear of COVID-19 have less hesitancy about getting vaccinated. This is an expected result. People who fear the disease are liable to volunteer to be vaccinated. However, as Bendau et al. (2021) stated in their study, even if a high level of fear reduces vaccination hesitancy, interventions that increase fear should not be considered as a way to increase the uptake of vaccination. In other words, while a moderate level of fear leads people to get vaccinated, an extreme level of fear (when one thinks that it is not possible to deal with a virus no matter what) may discourage people from taking precautions and, therefore, getting vaccinated.

One of the most effective ways to deal with the pandemic is vaccination. Primary measures to be taken that may clear the way for vaccination and alleviate people's hesitation about vaccination include informing people correctly, falsifying conspiracy beliefs via scientific data, encouraging activities that reduce stress,

and transparently sharing information about the current situation and measures taken regarding the pandemic. Conspiracy theorists use emotional language to reach large audiences (Germani – Biller-Andorno 2021). Calm scientific research based on data alone may not be enough to cope with the information pollution they spread. In line with this fact, supported by talented communication professionals, comprehensive communication campaigns that appeal to people's minds and emotions may be helpful.

There are some limitations of the study. First, the data were collected online through a questionnaire, and the convenience sampling method was used. The relationships examined in this study should be replicated over different samples. The sample group of the study consists of highly educated people. Participants gave their answers in the form of self-reports. Last, since the study was cross-sectional, it does not show dynamic trends. Being "anti-vaccination" is increasingly becoming an identity. It is especially "anti-vaxxers" who gather in the "echo chambers" of social media that continue to spread unscientific statements and strengthen their commitment to such views. The strengthening of an anti-vaccination identity will further increase vaccine indecision among the masses. For this reason, a focus on countering the "anti-vaccination identity" by academics who conduct research on this issue may help policymakers navigate potential risks in the future.

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