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THE RELATIONSHIP BETWEEN CONSPIRACY BELIEFS, FEAR OF INJECTION, ATTITUDE TOWARDS COVID-19 VACCINE, AND VACCINE HESITANCY

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Research Article

Abstract

Aim: The main purpose of this study is to determine the relationship between conspiracy beliefs, fear of injection, attitude towards COVID-19 vaccine, and vaccine hesitancy.

Methods: A population-based cross-sectional research design was used in the study. The population of the study consisted of individuals over the age of 18 residing in Adana city center between January and March 2022. The data were collected from 496 people using the online questionnaire technique. SPSS 23 and AMOS 26 package programs were used in the analysis of the data.

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Results: The effect of co1nspiracy theories on COVID-19 on vaccine hesitancy over attitudes towards COVID-19 vaccines was found to be negative. Similarly, the effect of fear of injection on vaccine hesitancy on attitudes towards COVID-19 vaccines was found to be negative.

Conclusion: Therefore, the attitude towards the COVID-19 vaccine partially mediates the relationship between the conspiracy theories towards COVID-19, fear of injection, and vaccine hesitancy.

Keywords: Conspiracy Beliefs, Fear of Injection, COVID-19, Attitude, Hesitation

INTRODUCTION

Vaccines are one of the most reliable and cost-effective public health interventions ever implemented, saving millions of lives each year (Hajj Hussein et al., 2015; Ehreth, 2003). The most important way of transmission, spread and control of COVID-19 is widespread vaccination of populations (Altmann et al., 2020). After the genome sequence of SARS-CoV-2 was deciphered in early 2020 and the World Health Organization declared a pandemic in March 2020, scientists and pharmaceutical companies quickly started to develop a vaccine (Zimmer et al., 2020; Coustasse et al., 2021). After the positive developments regarding the approval of SARS-CoV-2 vaccines, it has been observed that there is increasing optimism that the pandemic will end through herd immunity (Omer et al., 2020). However, it has been stated that one of the biggest obstacles to achieving such a goal is vaccine hesitancy and skepticism around the world (Coustasse et al., 2021; Neumann-Böhme et al., 2020).

Concerns about the novelty, efficacy, and potential side effects of current COVID-19 vaccines have been reported as the main reasons for rejection or hesitation to date (Neumann-Böhme et al., 2020). Vaccine hesitancy is defined as a delay in vaccine acceptance or rejection despite the availability of vaccination services (World Health Organization, 2019; MacDonald, 2015). Vaccine hesitancy has been shown by the World Health Organization as one of the top 10 threats to global health in 2019 (World Health Organization, 2019). Vaccine hesitation; It has been reported to result from a complex decision-making process influenced by a wide range of contextual, individual and group factors such as communication, media, historical influences, religion, culture, gender, socioeconomic, political and geographical barriers, and vaccination experience, risk perception, and vaccination program design (MacDonald et al., 2015).

Vaccine hesitation; it has been reported that it causes the re-emergence of vaccine-preventable infectious diseases such as measles, polio and pertussis (Phadke et al., 2016). Vaccination hesitancy; It has been attributed to the "3 Cs" model, which indicates trust, peace of mind, and nonconformity (MacDonald, 2015). Lack of trust in vaccines and providers, complacency in the need for vaccines, and the lack of affordability and affordability of the vaccine are the main factors behind vaccine hesitancy (Shen and Dubey, 2019; De Figueiredo et al., 2020). Conspiracy beliefs can also lead to vaccine hesitancy, fueling distrust in governments, healthcare providers and the pharmaceutical industry, along with their known negative impact on human health behavior (Jolley and Douglas, 2014; Bertin et al., 2020).

It has been stated that conspiracy theories about the COVID-19 epidemic started early and these theories revolved around aspects of the virus being man-made (Romer and Jamieson, 2020). In addition, such harmful beliefs have been popularized to include concepts related to possible vaccines, such as forcing people to vaccinate by placing microchips in order to control them. In addition, claims that COVID-19 vaccines may cause infertility by limiting the growth of the human population have received great attention on social media (Romer and Jamieson, 2020; Shahsavari et al., 2020). It has been stated that such claims, circulating without any evidence on some social media platforms, have had a significant negative impact on the general public's attitude towards possible vaccines (Shahsavari et al., 2020; Ahmed et al., 2020).

Vaccine indifference has been associated with a lower risk of vaccine-preventable diseases and therefore more negative attitudes towards vaccines (French et al., 2020). In a study conducted in the USA; 50% of Americans stated that they were willing to receive the vaccine, 30% were unsure, and 20% refused the vaccine (Neergaard and Fingerhut, 2020). In another study on adult Americans; 58% of the participants stated that they intended to be vaccinated, 32% were unsure, and 11% did not intend to be vaccinated (Fisher et al., 2020). In this period, it is important to develop the strategies needed to prevent vaccine hesitancy against the COVID-19 vaccine on the basis of countries and to adopt a strategic approach. In the development of strategies, determining the factors that directly and indirectly affect vaccine instability and determining the relationships between these factors are among the first activities to be done. The main purpose of this study is to examine the mediating effect of the COVID-19 vaccine attitude in the effect of conspiracy theories

against COVID-19 and fear of injection, which gained importance during the pandemic period, on the COVID-19 vaccine hesitancy.

1. RESEARCH METHODOLOGY

1.1.Study Design, Procedures and Participants

In this study, a population-based cross-sectional research design was used. This cross-sectional study was carried out on individuals over the age of 18 residing in Adana city center between January-February-March 2022 using the online survey technique. The purpose of the study was explained to all participants beforehand. Basic instructions were given for completing the questionnaire and participants were informed that all their data would be recorded anonymously. It was stated that participation in the survey was voluntary. Data collected from 496 people in total were analyzed. 46.8% of the participants were male and 53.2% were female.

Instruments

The questionnaire consisted of six parts in total. The first part included information about the main purpose of the study, that the participation was voluntary and that personal information would be kept confidential. In the second part, statements revealing the socio-demographic characteristics of the participants are included. The third, fourth, fifth and sixth sections consist of the following two measurement tools used in the research.

Conspiracy Beliefs

Participants' thoughts on conspiracy theories about COVID-19 were determined using the "coronavirus conspiracy scale" (Freeman et al., 2021). The questionnaire consisted of 21 items measuring a general level of coronavirus conspiracy theories. The questionnaire, which was prepared in Turkish, was evaluated using a five-point Likert scale. High scores indicated high level of coronavirus conspiracy theories (Cronbach's alpha = 0.963).

Fear of Injection

The injection fear levels of the participants were determined using the “injection fear scale” (Freeman et al., 2021). The questionnaire consisted of 4 items measuring a general injection fear level. The questionnaire, which was prepared in Turkish, was evaluated using a five-point Likert scale. High scores indicated higher injection fear level. (Cronbach's alpha = 0.949).

Attitude towards COVID-19 Vaccine

Participants' attitudes towards COVID-19 were determined using the "COVID-19 attitude scale" (Mir et al., 2021). The questionnaire consisted of 4 items measuring a general attitude level. The questionnaire, which was prepared in Turkish, was evaluated using a five-point Likert scale. High scores indicated the level of positive attitude (Cronbach's alpha = 0.918).

Vaccine Hesitancy

Vaccine hesitancy of the participants was determined using the "vaccine hesitancy scale" (Shapiro et al., 2018). The questionnaire consisted of 7 items measuring a general level of vaccine hesitancy. The questionnaire, which was prepared in Turkish, was evaluated using a five-point Likert scale. High scores indicated a high level of vaccine hesitation. (Cronbach's alpha = 0.969).

1.2.Statistical Analysis

All statistical analyzes were performed using IBM SPSS 23 and AMOS package programs. First of all, descriptive statistics were made to reveal the demographic characteristics of the participants and the scores of the tested constructs (conspiracy theories against COVID-19, fear of injection, attitude and hesitancy to vaccine). Finally, structural equation modeling (SEM) was performed using the maximum likelihood estimation method to examine the model that included conspiracy theories for COVID-19, fear of injections, and attitude towards COVID-19 in vaccine hesitancy. That is, attitude towards the COVID-19 vaccine has been hypothesized to mediate the relationship between COVID-19 conspiracy theories, fear of injection, and vaccine hesitancy (see Figure 1 for the proposed model). All variables were standardized before the model was tested. The significance of the regression coefficients was determined by calculating the 95% bootstrap confidence interval. The bias-corrected bootstrap test with 10,000 bootstrap samples was used to examine whether the mediating effect exists.

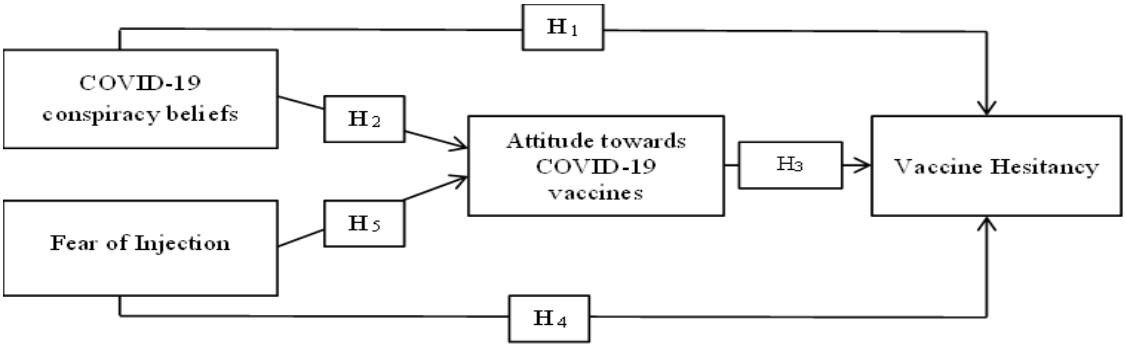


Figure 1. Theoretical model

2. FINDINGS

2.1. Demographic findings and descriptive statistics

Table 1 shows the demographic characteristics of the participants and t test and ANOVA test regarding conspiracy theories against COVID-19, fear of injection, attitude and hesitancy to vaccine.

Table 1. Sociodemographic characteristics of participants

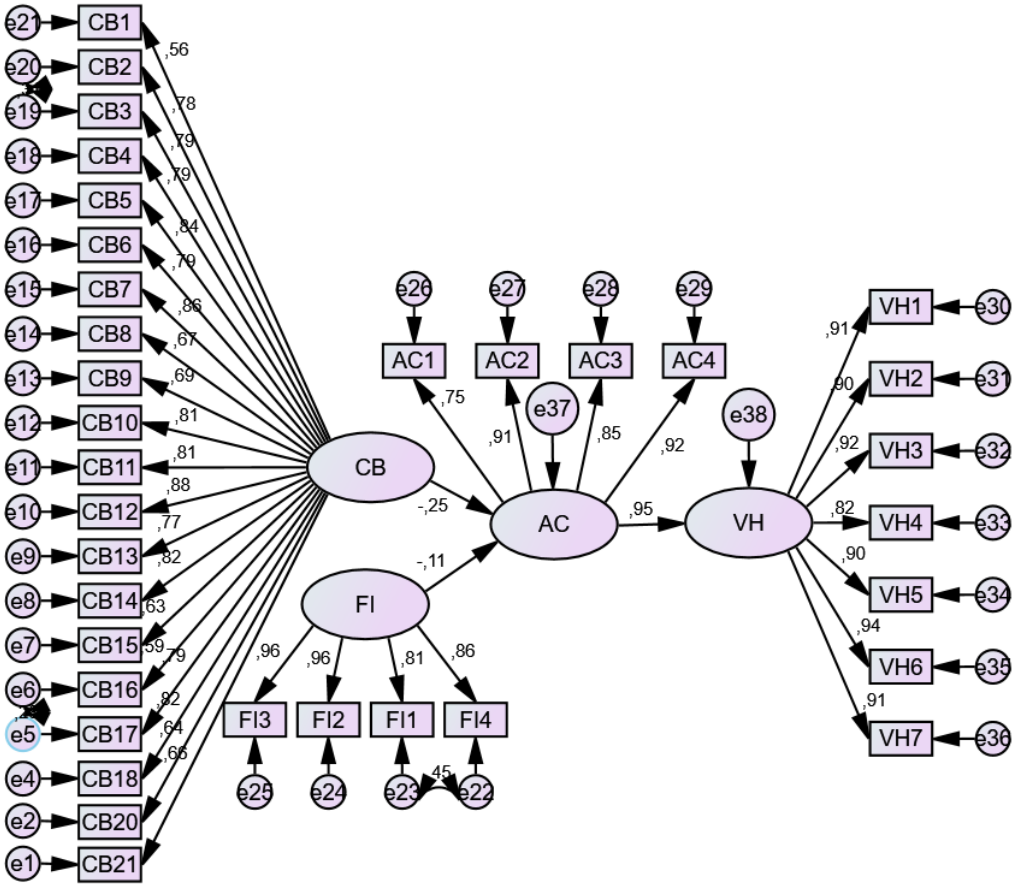
			Conspiracy Beliefs		Fear of Injection		Attitude Towards COVID-19 Vaccine		Vaccine Hesitancy	
Variables	**n**	**%**	**t Test/ Anova (t/F)**	**p**	**t Test/ Anova (t/F)**	**p**	**t Test/ Anova (t/F)**	**p**	**t Test/ Anova (t/F)**	**p**
Gender										
male	232	46,8	-3,209[a]	,001	-4,189[a]	,000	2,169[a]	,031	2,763[a]	,006
female	264	53,2								
Age										
18–25 years	154	31,0	2,126[b]	,076	6,373[b]	,000	5,423[b]	,000	6,147[b]	,000
26-35 years	151	30,4								
36-45 years	65	13,1								
46-55 years	61	12,3								
>55	65	13,1								
Job										
employee	33	6,7	2,253[b]	,029	4,878[b]	,000	3,811[b]	,000	3,832[b]	,000
officer	132	26,6								
retired	32	6,5								
housewife	69	13,9								
selfemployment	27	5,4								
student	117	23,6								
unemployed	36	7,3								
private sector employee	50	10,1								
Origin of COVID-19										
artificial virus	337	67,9	18,926[a]	,000	3,301[a]	,001	-5,423[a]	,000	-5,666[a]	,000
natural virus	159	32,1								

[a] Independent sample t-test
[b] ANOVA test

2.2.The Results of the Measurement Model

It was assumed that the reasoning between the variables in the research model can be explained. Confirmatory factor analysis was performed to test the validity of the scales used, and the structure of all scales were verified. Figure 1 shows the path analysis results and model fit for

the variables of conspiracy beliefs, fear of injection, attitude towards COVID-19 vaccine, and vaccine hesitancy.



[CMIN/DF=3.277, RMR=0.070, IFI=0.927, TLI=0.921, CFI=0.927, RMSEA=0,068]

Figure 2. The results of the full model

The results for measuring the reliability and validity of the measurement model provide various measures of the measurement model, as shown in Table 2. Since the CR values are greater than 0.7 and AVE values are greater than 0.50 the factors have high construct reliability.

Table 2. The items' estimate and the constructs' Cronbach's α, AVEs and C.R.s.

Constructs	Items	Estimate	Mean (±SD)	Cron. α	AVE	CR
Conspiracy Beliefs (CB)	CB21	,664		0,963	0,57	0,94
	CB20	,639				
	CB18	,824				
	CB17	,790				
	CB16	,587				
	CB15	,633				
	CB14	,821				
	CB13	,767				

Constructs	Items	Estimate	Mean (±SD)	Cron. α	AVE	CR
	CB12	,875	2,9083 (±0,97394)			
	CB11	,807				
	CB10	,810				
	CB9	,689				
	CB8	,671				
	CB7	,864				
	CB6	,789				
	CB5	,838				
	CB4	,791				
	CB3	,794				
	CB2	,783				
	CB1	,562				
Fear of Injection (FI)	FI4	,858	2,0519 (±1,13349)	0,949	0,81	0,92
	FI1	,806				
	FI2	,958				
	FI3	,957				
Attitude Towards COVID-19 Vaccine (AC)	AC1	,755	3,0282 (±1,23663)	0,918	0,74	0,86
	AC2	,907				
	AC3	,848				
	AC4	,916				
Vaccine Hesitancy (VH)	VH1	,908	3,0481 (±1,26398)	0,969	0,81	0,94
	VH2	,896				
	VH3	,923				
	VH4	,825				
	VH5	,903				
	VH6	,943				
	VH7	,910				

As a result of the path analysis, the overall reliability coefficient was found to be Alpha=0.900. Because $0.60 \leq \alpha < 0.80$, the scale is highly reliable. Ensuring validity and reliability shows the existence of a structural relationship between conspiracy beliefs, fear of injection, attitude towards COVID-19 vaccine, and vaccine hesitancy. The fit values examined show that the data fit the model well. Table 3 shows the results of the structural model.

Table 3. The result of the structural model

Hypothesis	Paths	Estimate	S.E.	C.R.	P	Result
Effect of Conspiracy Beliefs and Fear of Injection on Attitude towards COVID-19 Vaccine						
H_2, H_5, H_3	AC <--- CB	-,253	,058	-5,275	***	H_2 supported
	AC <--- FI	-,110	,043	-2,422	,015	H_5 supported
	VH <--- AC	,946	,059	20,684	***	H_3 supported

P<0.001

The effect of conspiracy beliefs about COVID-19 on attitudes towards COVID-19 vaccine was found to be negative and highly significant. The effect of fear of injections on the attitude

towards the COVID-19 vaccine was found to be negative and highly significant. The effect of the attitude towards the COVID-19 vaccine on vaccine hesitancy was found to be negative and highly significant. Table 4 shows the results of the indirect effect of the variables.

Table 4. Indirect effect of the variables

Indirect Path	Unstandardized Estimate	Standardized Estimate	p
CB --> AC --> VH	-,374	-,239	***
HI --> AC --> VH	-,126	-,104	***

P<0.001

The effect of conspiracy theories on COVID-19 on vaccine hesitancy over attitudes towards the COVID-19 vaccine is negative. The effect of fear of injections on vaccine hesitancy over the attitude towards the COVID-19 vaccine is negative.

3. DISCUSSION

A delay in getting the vaccine or refusal despite reaching the vaccine is defined as vaccine hesitancy and may be for one or more vaccines. Vaccine refusal is the case of not having any vaccination (Larsona et al., 2015). Despite the known positive effects of vaccine applications on public health; Vaccine hesitancy, which is increasing day by day all over the world, is due to the combination of many social, cultural, political and personal factors (Kestenbaum and Feemster, 2015).

Vaccination hesitancy is seen as an important obstacle to the vaccination of the entire population against infectious diseases. Globally, vaccine safety concerns coinciding with the rapid development of COVID-19 vaccines are contributing to increased vaccine hesitancy. At the same time, research shows that loss of trust in governments and healthcare providers is a major factor in the development of a range of beliefs and behaviors that give rise to vaccine hesitancy. The World Health Organization defines vaccine hesitancy as “hesitating or not accepting vaccines despite the availability of vaccination services”. Accordingly, the extent of vaccine hesitancy refers to situations where “vaccination acceptance in a given setting is lower than would be expected given the availability of vaccination services”.

It is important to determine the relationships between the factors affecting the COVID-19 vaccine hesitancy and to develop the necessary interventions in this regard in controlling the epidemic. In this study, it was aimed to determine the relationships between conspiracy beliefs towards COVID-19, fear of injection, attitude towards COVID-19 vaccine, and vaccine hesitancy.

As a result of the path analysis, the overall reliability coefficient was found to be Alpha=0.900. Because $0.60 \leq \alpha < 0.80$, the scale is highly reliable. Ensuring validity and reliability shows the existence of a structural relationship between conspiracy beliefs, fear of injection, attitude towards COVID-19 vaccine, and vaccine hesitancy. The fit values examined show that the data fit the model well.

In this study, the effect of conspiracy beliefs about COVID-19 on attitudes towards COVID-19 vaccine was found to be negative and highly significant. The effect of fear of injections on the attitude towards the COVID-19 vaccine was found to be negative and highly significant. The effect of the attitude towards the COVID-19 vaccine on vaccine hesitancy was found to be negative and highly significant. The effect of conspiracy theories on COVID-19 on vaccine hesitancy over attitudes towards the COVID-19 vaccine is negative. The effect of fear of injections on vaccine hesitancy over the attitude towards the COVID-19 vaccine is negative. Thus, to explore the factors that influence COVID-19 and COVID-19 vaccine intention; It will help governments and policymakers identify and adopt appropriate interventions to address concerns and hesitations, and to increase confidence in the vaccine.

The basis of believing in conspiracy theories is that they offer a simple explanation about a stressful event and create a feeling of regaining control (Duplaga and Grysztar, 2021). It is stated that conspiracy theories offer simple and consistent explanations that meet the needs of individuals for predictability and precise results in situations where uncertainty arises. In this context, the spread of conspiracy theories in a certain crisis has the potential to cause problems in understanding the reality and danger potential of the variables that make up the crisis (Weigmann, 2018). Pummerer et al. (2021), in their research, found that believing in conspiracy theories about COVID-19 reduces trust in institutions, disrupts compliance with official regulations and social distance measures, and decreases social interaction to a certain extent. Bierwiaczonek et al. (2020) described conspiracy theories as a public health threat in the light of the findings of their research. Goertzel (1994) stated that when an individual believes in a conspiracy theory, they tend to believe in different conspiracy theories as well.

In a study of a representative group from the United States, 29% of respondents said the effects of COVID-19 were exaggerated to wear out President Trump; it was stated that 31% believed that the virus was produced and spread to serve a purpose (Uscinski et al., 2020). In a similar study conducted by Akyüz (2021), it was emphasized that there was a high level of

participation in the claim that COVID-19 was produced in the laboratory. Freeman et al. (2020) underline that conspiracy theories create distrust and reduce the vaccination process by damaging social cohesion. One of the main reasons for hesitation about vaccination is the risk/benefit dilemma. The success of immunization studies depends on the trust in the applied vaccination programs (Turkish Medical Association, 2020). Despite all the known benefits of vaccines, people may exhibit negative attitudes and behavior towards vaccination due to reasons such as doubting the safety and efficacy of vaccines, and distrust of governments and healthcare workers (Salmon et al., 2005).

Lack of information about vaccines, lack of trust in vaccines, difficulty in accessing vaccines, fear of the side effects of vaccines, anti-vaccine news in the media, and not having enough information about vaccine-preventable diseases feed the "vaccine hesitation" in society. Scientific studies; It shows that good communication and trust by healthcare professionals with the individuals to be vaccinated and/or their parents is one of the most effective ways to overcome hesitations about vaccination (Republic of Turkey Ministry of Health 2nd National Vaccine Workshop, 2016; Larson et al., 2011).

4. CONCLUSION AND RECOMMENDATION

The risk of hesitation in vaccination was found to be higher in situations where vaccinations are mandatory and/or where there is high social pressure. Conversely, where individuals and communities demand, support and/or advocate for vaccination and vaccination services, the risk of developing vaccine hesitancy is much lower. Vaccination hesitancy is a complex concept. It is considered to be situation-specific and varies with time, place, and vaccines. A person who is hesitant about vaccination may delay vaccinations, may be reluctant to vaccinate, but still accept or reject one, some, or all of the vaccinations. Many of the existing studies are based on the assumption that vaccine hesitancy arises due to "lack of knowledge" or knowledge gap. However, this finding alone is not sufficient when approaching vaccine hesitancy. Many different levels of intervention programs can be designed to regress vaccine hesitancy or vaccine rejection.

It has also been shown that hesitant individuals make more positive decisions about getting vaccinated when healthcare providers, especially physicians, communicate effectively with strong statements about the need for vaccines, the value of vaccine, and vaccine safety. The best way to achieve this is for healthcare providers to feel confident about the safety, effectiveness and importance of vaccination. However, recent studies have shown that some health care providers

also have some hesitations about vaccination in their professional and personal lives. Therefore, one of the most important steps to be taken is the development of effective strategies to overcome the vaccine hesitancy seen among healthcare providers.

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