

The Mediating Role of Germ Aversion in the Relationship between Fear of COVID-19 and Intention to Vaccinate

COVID-19 Korkusu ile Aşı Olma Niyeti Arasındaki İlişkide Mikroptan Kaçınmanın Aracılık Rolü

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ABSTRACT

Objective: In the study, it was aimed to determine the fear level of COVID-19 and to demonstrate the relationship between fear of COVID-19 and intention to vaccinate.

Materials and Methods: The study population consisted of young, middle, and elderly patients and their relatives who applied to a family medicine unit operating in the city center of Düzce. Data were collected from 530 people using the face-to-face survey technique. The researchers used IBM SPSS Statistic Base 23 V and AMOS package programs for statistical analysis.

Results: The empirical result of the study revealed that as the fear level of COVID-19 increased, the intention to get vaccinated for COVID-19 increased positively. In addition, it has been determined that germ aversion behavior has a significant indirect effect and fully mediates the relationship between fear of COVID-19 and intention to get vaccinated.

Conclusions: This research revealed that increasing COVID-19 fear level positively increases the intention to be vaccinated through high germ aversion behavior.

Keywords: COVID-19, fear, germ aversion, structural equation modeling, vaccine

ÖZ

Amaç: Çalışmada COVID-19 korku düzeyinin belirlenmesi ve COVID-19 korkusu ile aşı olma niyeti arasındaki ilişkinin ortaya konulması amaçlanmıştır.

Materyal ve Metot: Araştırmanın evrenini Düzce İl merkezinde faaliyet gösteren bir aile hekimliği birimine başvuran genç, orta ve ileri yaş grubu hasta ve hasta yakınları oluşturmuştur. Veriler yüz yüze anket tekniği kullanılarak 530 kişiden toplanmıştır. Verilerin analizinde IBM SPSS 23 ve AMOS paket programları kullanılmıştır.

Bulgular: Çalışmanın ampirik sonucu COVID-19 korku düzeyi arttıkça, COVID-19 aşı olma niyetinin de olumlu yönde arttığını ortaya koymuştur. Bunun yanı sıra mikroptan kaçınma davranışının, COVID-19 korkusu ile aşı olma niyeti arasındaki ilişkide önemli derecede dolaylı bir etkiye sahip olduğu ve tam bir arabuluculuk ettiği tespit edilmiştir.

Sonuç: Bu araştırma, artan COVID-19 korku düzeyinin yüksek mikroptan kaçınma davranışı yoluyla aşı olma niyetini olumlu yönde artırdığını ortaya koymuştur.

Anahtar Kelimeler: Aşı, COVID-19, korku, mikroptan kaçınma, yapısal eşitlik modellemesi

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INTRODUCTION

It has been seen that there has been more than one epidemic disease in the world throughout history, and millions of people lost their lives in these epidemics. The last epidemic disease humankind has to fight is the COVID-19 epidemic.¹ COVID-19 respiratory infectious disease, which emerged in Wuhan city of Hubei province of China in December 2019 and affected the whole world, was declared a pandemic by the World Health Organization on March 11, 2020.² In our country, the first case of COVID-19 was seen on March 11, 2020.³ Although the virus differs from country to country until now, it has been seen that it has infected more than 200 million people worldwide, and it is known that it has caused more than 4 million people to die.⁴

During this extraordinary pandemic, governments worldwide have taken various initiatives to prevent the spread of the epidemic. In this direction, they have taken measures such as curfews, quarantine practices, promotion of flexible working in business life, the adoption of the distance education model by closing schools, overseas travel restrictions, mask requirements, and social distance rules.⁵ However, it has been stated that the most promising solution is to protect people from the coronavirus epidemic, which infects people globally due to its highly contagious nature, and to reduce the death and disease rates caused by the epidemic.⁶

Previous research on other vaccine-preventable diseases has shown that identifiable factors can influence vaccination intentions and acceptance. For example, certain sociodemographic factors such as socioeconomic status, age, race and ethnicity, and geographic location played a role in favor of adult vaccines.^{7,8} In addition, since vaccination is based on the principle of "herd immunity", it has been stated that behaviors that benefit others, such as general altruism, prosocial behavior, and sympathy, play an essential role in some vaccination decisions.⁹ At the same time, theoretical models such as the health belief model stated that variables such as perceived severity and susceptibility to disease could predict behavioral intentions and behaviors.^{10,11}

In this study, the mediating role of germ avoidance behavior, which is described as a psychological factor in the effect of fear of COVID-19 on the intention to be vaccinated, on this relationship was revealed. In the literature, it has been stated that people's fear levels increase more, especially in cases where the risk of death is high. This situation leads individuals to engage in preventive health behaviors.¹² Similarly, it was emphasized that individuals with a high fear of COVID-19 use personal protective equipment more often and wash their hands more often.¹³ Based on those mentioned scientific

theoretical evidence and the established hypothesis, the mediating role of germ avoidance behavior on vaccination intention was tested in the current study. According to the protection motivation theory, it has been stated that how a person perceives the possibility of being infected can be triggered by fear and then result in protective behavior.¹⁴

In the study, it was aimed to determine the fear level of COVID-19 and to demonstrate the relationship between fear of COVID-19 and intention to vaccinate.

MATERIALS AND METHODS

Ethics Committee Approval: This study was approved by Düzce University Scientific Research and Publication Ethics Committee (Date: 24.06.2021, decision no: 2021/179), and a verbal informed consent form was obtained from all patients. This study was conducted by Declaration of Helsinki.

Study Design, Participants, Instruments: This cross-sectional study was carried out on young, middle, and advanced age group patients and their relatives who applied to a family medicine unit operating in Düzce city center between July 1 and September 17, 2021.

Approximately 600 people said that they would like to participate in the survey. However, 70 people could not fill out the questionnaire due to the density. Therefore, the final sample consisted of 530 participants.

Statistical Analysis: The data were collected by the researchers themselves by face-to-face survey technique. All statistical analyzes were performed using IBM SPSS Statistic Base 23 V and AMOS programs. The COVID-19 fear level of the participants was determined using the COVID-19 Fear Scale.¹⁵ The questionnaire consisted of 7 items measuring a general COVID-19 fear level. Germ aversion behavior was measured using an eight-item scale.¹⁶ The questionnaire, prepared in Turkish, was evaluated using a five-point Likert scale. Intention to get vaccinated against COVID-19 was measured using a two-item scale.¹⁷ In addition, the questionnaire, which was prepared in Turkish, was evaluated using a five-point Likert scale.

RESULTS

Table 1 presents the frequency values revealing the socio-demographic characteristics of the participants and the t-test and ANOVA analysis results revealing whether the COVID-19 fear levels, vaccination intentions and germ avoidance of the participants differ significantly according to these socio-demographic characteristics. In Table 1, frequency values revealing the socio-demographic characteris-

tics of the participants and the results of the t-test and ANOVA analysis are given. Figure 1 shows the structural relationships between the research variables (the research model) and these relationship values. Also Figure 1 shows the confirmatory factor analysis results and model fit for the variables of fear of COVID-19, germ aversion, and intention to get vaccinated. In Figure 1, since the

values of goodness of fit were within acceptable limits, significant relationships were found between the variables of the study. The fit values given for the model above show that the model fit is achieved. There is no limit to the values to look up. The reported values may vary according to the values the researcher wants to draw attention to.

Table 1. Sociodemographic characteristics of participants.

Variables	n	%	Fear of COVID-19		Germ Aversion		Intention to Get Vaccinated		
			t Test/	p-value	t Test/	p-value	Anova (t/F)	t Test/ (2tailed)	p-value
Sex	Male	130	24.5	4.453 ^a	0.001	6.879 ^a	0.001	1.453 ^a	0.147
	Female	400	75.5						
Age categories	18-25 years	48	9.1	0.610 ^a	0.525	0.183 ^b	0.932	3.029 ^a	0.003
	26-35 years	173	32.6						
	36-45 years	200	37.8						
	46-55 years	90	17						
	>55	19	3.6						
Educational attainment	Junior college and below	174	32.8	0.083 ^b	0.972	0.180 ^b	0.893	6.289 ^b	0.002
	College	326	61.5						
	Master's degree	25	4.7						
	Doctoral degree	5	.9						
Job	Employee	17	3.2	2.620 ^b	0.083	1.830 ^b	0.051	1.037 ^b	0.378
	Officer	31	5.8						
	Retired	14	2.6						
	Housewife	328	61.9						
	Self-employment	13	2.5						
	Student	44	8.3						
	Unemployed	18	3.4						
Presence of chronic diseases	Private sector employee	57	10.8	0.297 ^a	0.771	1.832 ^a	0.064	1.876 ^a	0.060
	Other	8	1.5						
Regular drug use	Yes	75	16.3	1.823 ^a	0.087	2.165 ^a	0.055	3.484 ^a	0.002
	No	455	83.7						
	Yes	98	18.5						
	No	432	81.5						

^a: Independent sample t-test; ^b: ANOVA test.

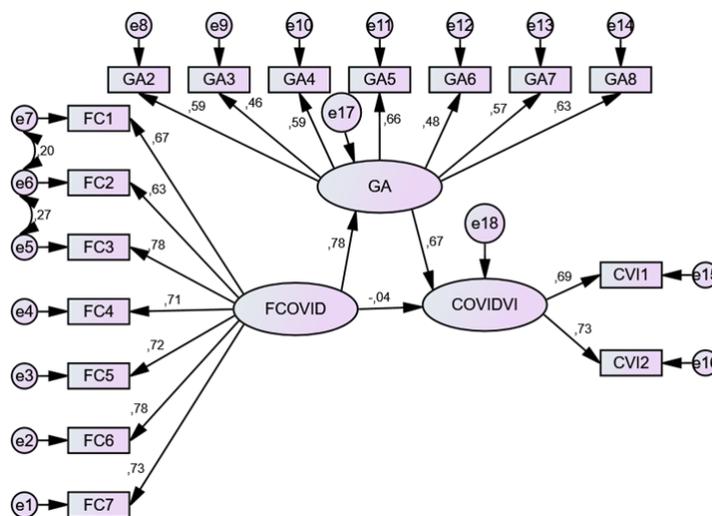


Figure 1. The results of the full model and goodness of fit values. Goodness of fit values: (CMIN/DF=4.033; GFI=0.917; CFI=0.911; AGFI=0.886; TLI=0.904; IFI=0.912; AGFI=0.837; RMSEA=0.074).

In Table 2, standardized regression coefficients, mean and standard deviation values, reliability coefficients, Average Variance Extracted (AVE) values and Critical Ratio (CR) values of the sub-variables of the study are given as a result of the path analysis. Since the calculated AVE values are greater than 0.5 and the CR coefficients are greater than 0.7, the factors have high construct reliability and thus concordance validity. The results for measuring the reliability and validity of the measurement model provide

various measures, as shown in Table 2. The findings obtained from confirmatory factor analysis and path analysis show that the construct validity of the model is provided. As a result of the confirmatory factor analysis, the overall reliability coefficient was Alpha=0.918. In addition, the regression values in Table 2 show the power of the observed variables to predict latent variables, that is, factor loadings. The significant “p” values indicate that the items were loaded correctly on the factors.

Table 2. The items’ estimate and the constructs’ Cronbach’s α , AVEs, and CRS.

Constructs	Items	Estimate	Cronbach’s α	AVE	Mean \pm SD	C.R.
Fear of COVID-19 (FCOVID)	FC7	0.733	0.885	0.52	4.2457 \pm 0.02978	0.90
	FC6	0.781				
	FC5	0.721				
	FC4	0.712				
	FC3	0.778				
	FC2	0.633				
	FC1	0.674				
Intention to Get COVID-19 Vaccinated (COVIDVI)	CVI1	0.686	0.663	0.50	3.7217 \pm 0.03940	0.70
	CVI2	0.730				
	GA2	0.589				
	GA3	0.458				
	GA4	0.595				
Germ Aversion (GA)	GA5	0.656	0.765	0.32	3.7962 \pm 0.02632	0.76
	GA6	0.475				
	GA7	0.569				
	GA8	0.633				

Table 3 shows the results of the structural model, the structural relationships among the variables, and the path coefficients before and after mediation. Moreover, Table 3 shows the results of the structural model, the structural relationships among the variables, and the path coefficients before and after mediation. The path coefficient shows how many units will change in the dependent variable for a one-unit change in the independent variable. Therefore, in

Table 3, there is a full mediation relationship since the direct relationship between the independent and dependent variables is completely eliminated. The indirect relationship and its properties are shown in Table 4. When the mediator variable (perceived infectability) is included in the model with the independent variable (fear of COVID-19) are included in the model, the direct effect of the independent variable (fear of COVID-19) on the

Table 3. The result of the structural model.

Hypothesis	Paths	Estimate	S.E.	C.R.	p	Result
Effect of Fear of COVID-19 on Intention to Get COVID-19 Vaccinated (Before Mediation)						
H ₁	COVIDVI <--- FCOVID	0.499	0.082	8.342	0.001	H ₁ supported
Effect of Fear of COVID-19 on Intention to Get COVID-19 Vaccinated (After Mediation)						
H ₂	GA <---FCOVID	0.776	0.067	11.350	0.001	H ₂ supported with a full mediation
	COVIDVI <--- FCOVID	-0.039	0.131	-0.386	0.699	
	COVIDVI <--- GA	0.667	0.159	5.589	0.001	

dependent variable (intention to get vaccinated) becomes insignificant and creates a whole mediation relationship. Therefore, as seen in Table 4, when the mediating variable (Germ Aversion) is included in the model together with the independent variable

(Fear of COVID-19), the effect of the independent variable (Fear of COVID-19) on the dependent variable (Intention to Get COVID-19 Vaccinated) is insignificant ($p=0.699$).

Table 4. Indirect effect of the model.

Indirect Path	Unstandardized Estimate	Standardized Estimate	p value
FCOVID --> GA --> COVIDVI	0.623	0.479	0.699

DISCUSSION AND CONCLUSION

In this research, there was a statistically significant difference in Fear of COVID-19 score according to sex (t -test = 4.453; $p<0.05$). However, there was no significant relationship among the age of the participants, the educational level of the participants, the jobs of the participants, the presence of chronic disease in the participants, and the regular drug use of the participants. Furthermore, there was a statistically significant difference in germ aversion score according to sex (t -test = 6.879; $p<0.05$). However, there was no significant relationship among the age of the participants, the educational level of the participants, the jobs of the participants, the presence of chronic disease in the participants, and the regular drug use of the participants. Moreover, there was a statistically significant difference in intention to get vaccinated score according to age (ANOVA test = 3.029; $p<0.05$), educational attainment (ANOVA test = 6.289; $p<0.05$), and regular drug use (t -test = 3.484; $p<0.05$). However, there was no significant relationship between the sex of the participants, the job of the participants, and the presence of chronic diseases ($p>0.05$).

Based on the above-mentioned theoretical discussions and hypotheses, this study tested the mediating role of germ avoidance behavior on the intention to vaccinate. Fear of COVID-19¹⁵ has been suggested in research as a potential precursor to vaccination intention. However, it has been stated that this level of fear can be triggered by several mediating factors¹⁸ or through high levels of existential anxiety.¹⁹ In addition, it is possible that while individuals are trying to cope with existential anxiety, conspiracy theories that will inevitably reduce their intention to be vaccinated may also develop.²⁰ As a result, on the one hand, the direct impact of fear of COVID-19 may positively influence the intention to vaccinate; On the other hand, the mediating effect of germ avoidance behavior may take this positive effect even further.

The results of our research showed the existence of a mediation model with direct and indirect effects on

the intention to vaccinate. The data confirmed our hypothesis that fear of COVID-19 is positively associated with choosing to vaccinate. Therefore, the findings of this study reflect conclusions from many studies that fear of COVID-19 is related to the intention to get the COVID-19 vaccine.²¹ In addition, in the present study, the mediating effect of germ avoidance behavior was revealed in the relationship between fear of COVID-19 and intention to be vaccinated. Therefore, it has been observed that when individuals experience fear, they can directly and rationally face proximal defenses to remove dangerous stimuli such as vaccination.

Recent studies have shown that the fear of COVID-19 is increasing worldwide.²² High levels of fear of COVID-19 may be associated with anxiety, distress, and depression²³ and lead to more severe cases such as suicide.²⁴ According to the protection motivation theory, individuals tend to have more healthy behaviors in the presence of a health risk. Similar to the current study results, it has been found that individuals with a high fear of COVID-19 tend to use personal protective equipment more frequently, wash their hands more regularly, and prefer remote medical consultations.¹³

In addition, the current findings provide evidence showing a potential mechanism for why the fear of COVID-19 is associated with getting a COVID-19 vaccine. More specifically, fear of COVID-19 may trigger the psychological factor of an individual's germ-avoidance behavior upon receiving the COVID-19 vaccine. This psychological factor will likely contribute to individuals' intentions to get the COVID-19 vaccine. Furthermore, Pyszczynski et al.²⁵, awareness of a death threat can activate proximal defenses to reduce feelings of vulnerability. Thus, proximal reasons can lead people to make healthy choices, such as engaging in healthy behaviors or getting vaccinated.²⁶

Also, this study revealed that germ avoidance behavior is essential in explaining individuals' intention to be vaccinated against COVID-19. Supporting the conclusion of our research, according to the protec-

tion motivation theory, it has been argued that perceived vulnerability is triggered by fear, followed by an intention to protect.^{27,14}

In conclusion, current research has explored different ways of confronting the fear caused by the COVID-19 pandemic. In addition, the present findings provided potential evidence as to why the fear of COVID-19 is associated with getting a COVID-19 vaccine. More specifically, it has been observed that fear of COVID-19 can trigger the psychological factor of germ avoidance on individuals' COVID-19 vaccine intake. It has also been observed that when people focus on the real risks of COVID-19 infection, their closest defensive behavior may require rational choices, such as the intention to vaccinate as soon as possible. Therefore, the direct impact of fear of COVID-19 may positively influence the intention to vaccinate; On the other hand, the mediating effect of germ avoidance behavior may take this positive effect even further.

Ethics Committee Approval: The study was approved by Düzce University Scientific Research and Publication Ethics Committee (Date: 24/06/2021, decision no: 2021/179).

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