



## The Relationship between Fear of COVID-19, Perceived Infectability and Intention to Get Vaccinated

*COVID-19 Korkusu, Algılanan Bulaşabilirlik ve Aşısı Olma Niyeti Arasındaki İlişki*

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## ABSTRACT

The primary purpose of this study is to evaluate the COVID-19 fear levels, COVID-19 infectability perceptions, and intention to get vaccinated of university undergraduate students during the period when new variations of the COVID-19 virus are seen in Turkey. Along with, is to determine the mediating role of COVID-19 infectability perception with the effect of fear of COVID-19 on the intention to get vaccinated. In the study, it was used an online-based cross-sectional study design on university students. The universe of the study consisted of all undergraduate students of Duzce University. It was preferred the convenience sampling method in the study. The researchers collected data from 557 students using the online questionnaire technique. Researchers used IBM SPSS Statistic Base 23 V and AMOS package programs in the analysis of the data. The study's findings revealed that most university students had high COVID-19 fear levels and COVID-19 infectability perceptions, and their intention to be vaccinated increased positively. In addition, the empirical result of the study revealed that as the fear level of COVID-19 increased, the purpose to be immunized for COVID-19 increased positively. In addition, it was determined that the perception of COVID-19 infectability had a significant indirect effect and fully mediated the relationship between fear of COVID-19 and intention to get vaccinated. This study revealed that increasing COVID-19 fear level positively increases the intention to get vaccinated through the perception of high COVID-19 infectability. Therefore, increased COVID-19 fear level and high COVID-19 infectability perception were positively correlated with increased intention to get vaccinated.

### Keywords

COVID-19, Fear, Infectability, Vaccine, Path Analysis.

## ÖZ

Bu çalışmanın temel amacı, Türkiye'deki COVID-19 virüsünün yeni varyasyonlarının görüldüğü dönemde üniversite lisans öğrencilerinin COVID-19 korku düzeylerini, COVID-19 bulaşabilirlik algılarını ve aşı olma niyetlerini değerlendirmek ve COVID-19 korkusunun aşı olma niyeti üzerine etkisinde COVID-19 bulaşabilirlik algısının aracılık rolünü tespit etmektir. Araştırmada üniversite öğrencileri üzerinde online temelli kesitsel araştırma tasarımı kullanılmıştır. Araştırmanın evrenini Düzce Üniversitesinin tüm lisans öğrencileri oluşturmuştur. Araştırmada kolayda örnekleme yöntemi tercih edilmiştir. Veriler online anket tekniği kullanılarak 557 öğrenciden toplanmıştır. Verilerin analizinde SPSS 23 ve AMOS 26 paket programları kullanılmıştır. Araştırmanın bulguları, üniversite öğrencilerinin büyük çoğunluğunun COVID-19 korku düzeylerinin ve COVID-19 bulaşabilirlik algılarının yüksek olduğunu ve aşı olma niyetlerinin olumlu yönde arttığını ortaya koymuştur. Ayrıca, çalışmanın ampirik sonucu COVID-19 korku düzeyi attıkça, COVID-19 aşı olma niyetinin de olumlu yönde arttığını ortaya koymuştur. Bunun yanı sıra COVID-19 bulaşabilirlik algısının, COVID-19 korkusu ile aşı olma niyeti arasındaki ilişkide önemli derecede dolaylı bir etkiye sahip olduğu ve tam bir arabuluculuk ettiği tespit edilmiştir. Bu araştırma, artan COVID-19 korku düzeyinin yüksek COVID-19 bulaşabilirlik algısı yoluyla aşı olma niyetini olumlu yönde arttırdığını ortaya koymuştur. Dolayısıyla artan COVID-19 korku düzeyi ve yüksek COVID-19 bulaşabilirlik algısı, olumlu yönde artan aşı olma niyeti ile önemli ölçüde ilişkili bulunmuştur.

### Anahtar kelimeler

COVID-19, Korku, Bulaşabilirlik, Aşı, Yol Analizi.

## INTRODUCTION

For nearly two years, the world population has been struggling with a global epidemic called COVID-19, and this epidemic represents a significant health threat (World Health Organization, 2021). This disease, which is highly contagious in human populations and is reported to be transmitted mainly by respiratory droplets and physical contact (Li vd., 2020), has also been reported to cause more than 3 million deaths with the difference in incidence to date (John Hopkins University, 2021). In addition, governments have introduced various non-pharmaceutical control systems to prevent the spread of the epidemic, such as quarantines, travel bans, mask requirements, and social distance rules, which significantly impact people's psychological health (Tian vd., 2020; Matranga vd., 2020). Until now, it has been seen that such non-pharmaceutical interventions can slow the progression of the disease, but it has been stated that the most promising solution to reduce the mortality and morbidity rates caused by the epidemic is the effective and safe antiviral agents and vaccines developed using the possibilities of medical technology (Kaddoura vd., 2020). In addition, mass vaccination programs are seen as the most critical public health measure to protect against COVID-19 (Wibawa, 2021) and the single most effective tool to defeat the epidemic (Graham, 2020). Therefore, it is seen that mass vaccination campaigns for COVID-19 are carried out and implemented in a planned manner all over the world. Communities reacted in two ways to mass vaccination activities carried out on communities. The first group of these is those inclined to be vaccinated and accept the vaccine anyway. The second group is those against the vaccine and support conspiracy theories as to the reason for their denial of the vaccine (Bertin vd., 2020; Sallam vd., 2021). At the same time, those against the COVID-19 vaccine and those who deny the vaccine also stated that they have no fear of any negative consequences that the epidemic may create (Hughes & Machan, 2021). In addition, while the COVID-19 pandemic, like other epidemics in human history, caused changes in all areas of daily life, the most changes occurred in the field of health systems, economy and education. In this process, many measures were taken to prevent the spread of the disease, which brought about sudden changes in work, education, social life and many usual routines. The education sector has also been greatly affected in this sense. The transition from face-to-face education to distance education and future uncertainties in education have increased the level of anxiety and fear in higher education students, leading to the emergence of stress factors (Cankurtaran, 2021).

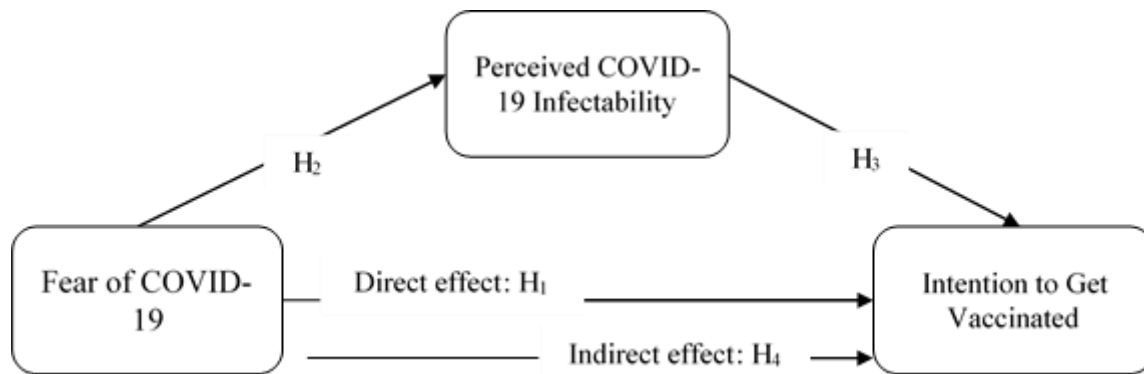
On the other hand, social and cultural factors and individual and psychological factors have been reported to play an essential role in influencing how people respond to ongoing mass vaccination campaigns and how they cope with death anxiety caused by the COVID-19 pandemic (Caci vd., 2020). In this study, the mediating role of the perception of COVID-19 infectability, which is defined as a psychological variable in the effect of fear of COVID-19 on the intention to get vaccinated on this relationship, is investigated. Recent studies have revealed that the level of fear caused by COVID-19 increases worldwide (Knipe vd., 2020). In addition, individuals' depression and anxiety levels increase, especially during periods when the number of cases increases (Rajkumar, 2020). It has been stated that confronting uncertain situations, especially when there is a potential risk of death, can increase people's levels of fear and anxiety, and this causes both healthy and vulnerable individuals to engage in preventive health behaviours (Shigemura vd., 2020). Redken et al. (Reuken vd., 2020) emphasized that individuals with fear of COVID-19 tend to use personal protective equipment more frequently,

wash their hands more regularly, and prefer remote medical consultations. In addition, the fear of transmitting the disease to someone else, who are at high risk of being infected with the COVID-19 virus, causes them to isolate themselves from being in the family, change their routines, and engage in protective behaviour (Wang vd., 2020; Huang vd., 2020). Engaging in such protective behaviours suggests that individuals with high COVID-19 fear levels are more likely to be vaccinated (Scrima vd., 2021). In a recent study, Head et al. (Head vd., 2020) stated a positive relationship between fear of COVID-19 and intention to get vaccinated. Similarly, in the study by Yakut (2020) et al., excessive workload; It has been determined that health personnel has a partial mediating effect on the burnout of COVID-19 fear, and a full mediator effect on the effect on perceived social support. Therefore, our first hypothesis we tested is:

*“H<sub>1</sub>: There is a positive relationship between fear of COVID-19 and intention to get vaccinated.”*

Based on the above-mentioned scientific theoretical evidence and the established hypothesis, we tested the mediating role of perceived COVID-19 infectability on attitude towards vaccine intake in this study. As shown in Figure 1, fear of COVID-19 (Ahorsu vd., 2020) is proposed as a potential antecedent of intention to vaccinate, and it is anticipated that fear of COVID-19 can only be triggered by perceived COVID-19 infectability (Duncan vd., 2009). According to the protection motivation theory, it has been argued that perceived vulnerability, that is, how a person perceives the possibility of being infected, is triggered by fear and then results in an intention to be protected (for example, the intention to get a COVID-19 vaccine) (Ling vd., 2019; Wang vd., 2021). As a result, on the one hand, fear of COVID-19 can positively influence the choice to vaccinate; on the other hand, we may see a positive effect in the same direction, with the mediating result of perceived COVID-19 infectability. The transition from face-to-face education to distance education during the COVID-19 pandemic process has revealed future uncertainties in education and increased the level of fear in higher education students, leading to the emergence of stress factors. In addition, the risk of contracting the disease, the necessity of maintaining physical distance, the stay at home process and the changes in the education process have greatly affected university students. On the other hand, the intensity of information and explanation towards reducing uncertainty in epidemic processes, the increase in fear in individuals, treatment methods and preventive practices such as vaccines cause significant changes in thoughts and tendencies. In this study, which was planned from this point of view; the intention of university students for the COVID-19 vaccine and the fear of coronavirus, which is thought to affect this intention, and the perceived contagiousness issues were examined. Therefore, our second hypothesis we tested is:

*“H<sub>2</sub>: Perceived COVID-19 infectability mediates the relationship between fear of COVID-19 and intention to vaccinate.”*

**Figure 1.** *Theoretical model*

## MATERIAL AND METHODS

### Study Design, Procedures and Participants

To achieve the aim of this study, the researchers designed and conducted a cross-sectional observational study. This cross-sectional study was conducted on university students studying at Düzce University in the fall semester of the 2020-2021 academic year and randomly surveyed between October 1 and October 20. The department the students learned was not specified as a criterion. 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. Before participating in the survey, written informed consent was obtained from all participants, and stated that participation was voluntary. A total of 650 people indicated that they wanted to participate in the survey. However, 93 people could not fill out the questionnaire due to the density. Therefore, the final sample consisted of 557 participants. The data were collected by the researchers themselves by online survey technique. The study participants were between the ages of 17 and 26. 41.50% of the participants were male students, and 58.50% were female students. Students who showed symptoms attributable to infectious disease at the time of data collection were excluded as it could affect their answers. Our study was approved by Düzce University Scientific Research and Publication Ethics Committee. (Date: 24.06.2021, Decision No: 2021/181).

### Instruments

In general, the questionnaire consists of four parts. The first part included information about the study's primary purpose and the consent form. In the second part, statements revealing the socio-demographic characteristics of the participants are included. Finally, the third part consists of the following three measurement tools used in this study.

#### *Fear of COVID-19*

The COVID-19 fear level of the participants was determined using the COVID-19 Fear Scale (Ahorsu vd., 2020). The questionnaire consisted of 7 items measuring a general COVID-19 fear level. The questionnaire, which was prepared in Turkish, was evaluated using a five-point

Likert scale. High scores indicated a high COVID-19 fear level (Cronbach's alpha = 0,885). The scale is quite reliable since this value is between  $0,80 \leq \alpha < 1,00$  (Kayış, 2009).

### ***Perceived Infectability***

Perceived COVID-19 infectability was measured using a seven-item scale (Duncan vd., 2009). The questionnaire is a 7-item self-report questionnaire measuring concerns about infectious diseases. The questionnaire, which was prepared in Turkish, was evaluated using a five-point Likert scale. A higher score indicated a higher perceived contagion of COVID-19 (Cronbach's alpha = 0,718). Cronbach alpha reliability coefficients higher than 0.60 are interpreted as being quite reliable (Kayış, 2009).

### ***Intention to get vaccinated***

Finally, intention to vaccinate against COVID-19 was measured using a two-item scale (Yahaghi vd., 2021). The questionnaire, which was prepared in Turkish, was evaluated using a five-point Likert scale. A higher score indicated a higher intention to get the COVID-19 vaccine (Cronbach's alpha = 0,663). The scale is quite reliable since this value is between  $0,60 \leq \alpha < 0,80$ . Cronbach alpha reliability coefficients higher than 0.60 are interpreted as being quite reliable (Kayış, 2009).

### **Statistical Analysis**

All statistical analyzes were performed using IBM SPSS Statistic Base 23 V and AMOS programs. First of all, descriptive statistics were made to reveal the demographic characteristics of the participants. Afterwards, structural equation modelling (SEM) was performed using the maximum likelihood estimation method to examine the model incorporating. More specifically, perceived COVID-19 infectability has been hypothesized to mediate the relationship between fear of COVID-19 and intention to vaccinate against COVID-19 (Figure 1). After all, variables were standardized. The model was tested. In addition, the following fit indices were taken as a basis:  $\chi^2/df < 5$ , CFI  $> 0,95$ , TLI  $> 0,95$ , IFI  $\geq 0,90$  and GFI values  $\geq 0,85$ , RMSEA  $< 0,06$  and SRMR  $< 0,08$  (Hu & Bentler, 1999; Byrne, 2001).

## **RESULTS**

### **Demographic findings and descriptive statistics**

Table 1 shows the demographic characteristics of the participants and the t-test and ANOVA test regarding fear of COVID-19, perceived infectability and intention to get vaccinated toward potential COVID-19 vaccines. You can see that 24,1% males and 75,9% females were the university students for this study, 32,1% of the students are in the 17-20 age range, 61,4% are in the 21-24 age range, and 6,5% are older than 24 years old. In addition, while 6,6% of university students live with their families, 93,4% live away from their families.

**Table 1.** Socio-demographic characteristics of participants

Variables	n	%	Fear of COVID-19		Perceived Infectability		Intention to Get Vaccinated	
			t Test/ Anova (t/f)	p-value (2tailed)	t Test/ Anova (t/F)	p-value (2tailed)	t Test/ Anova (t/F)	p-value (2tailed)
<b>Sex</b>								
Male	134	24,1	0,659 <sup>a</sup>	0,501	3,224 <sup>a</sup>	0,003	4,043 <sup>a</sup>	0,002
Female	423	75,9						
<b>Age</b>								
17-20	179	32,1	2,712 <sup>b</sup>	0,022	5,661 <sup>b</sup>	0,002	1,135 <sup>b</sup>	0,324
21-24	342	61,4						
≥24	36	6,5						
<b>Living with family</b>								
Yes	37	6,6	3,213 <sup>a</sup>	0,001	3,545 <sup>a</sup>	0,001	,913 <sup>a</sup>	0,346
No	520	93,4						

### The model fit measures

To have a good fit model and present a structural relationship, it is necessary to measure the relationship between latent variables and their components. Therefore, model fit was tested with different model fit indicators given in Table 2.

From Table 2, it can be summarized that this study questions/items of the latent variables pass through all the major model fit indicators suggested by Munro (Munro, 2005), Brown (Brown, 2006) and Byrne (Byrne, 2001).

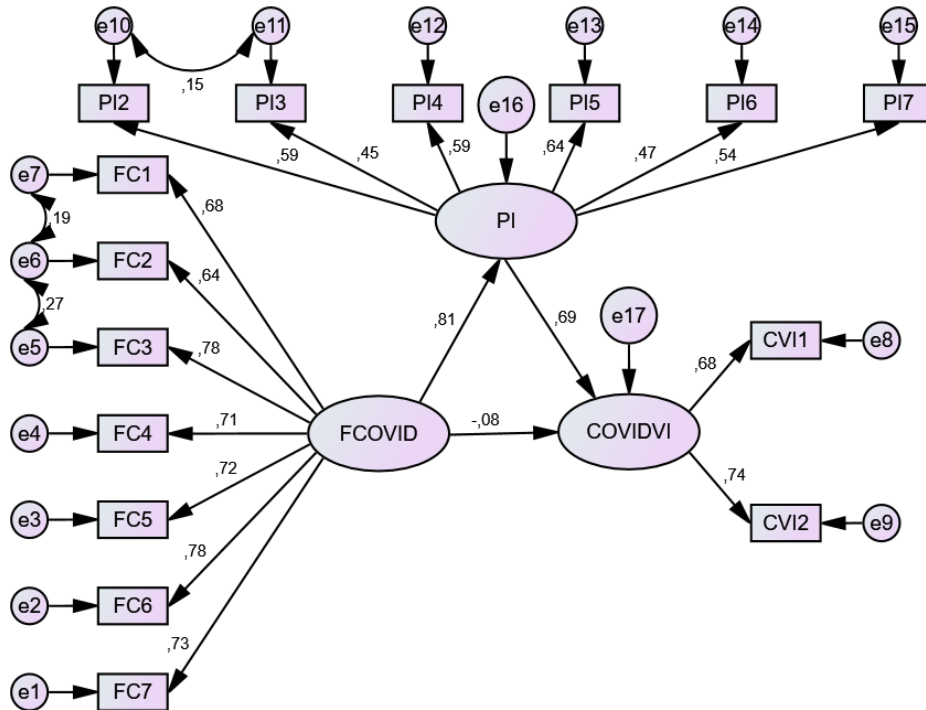
**Table 2.** Model fit measures

Measure	Estimate	Threshold	Interpretation
CMIN/DF	3,906	Between 1 and 5	Acceptable range
CFI	0,922	≥ 0,90	Within range
GFI	0,926	≥ 0,85	Within range
IF	0,922	≥ 0,90	Within range
TLI	0,902	≥ 0,90	Within range
RMR	0,046	< 0,08	Within range
RMSEA	0,072	< 0,08	Within range

### The results of the measurement model

It was assumed that the reasoning between the variables in the research model could be explained. Confirmatory factor analysis was performed to test the validity of the scales used, and the structure of all scales was verified. Figure 2 shows the confirmatory factor analysis results and model fit for the variables of fear of COVID-19, perceived infectability, and intention to get vaccinated.

Figure 2. The results of the full model



The results for measuring the reliability and validity of the measurement model provide various measures, as shown in Table 3. Since the C.R. values are more significant than 0,7, the factors have high construct reliability.

Table 3. The items' estimate and the constructs' Cronbach's  $\alpha$ , AVEs and C.R.s.

Constructs	Items	Estimate	Cronbach's $\alpha$	Mean ( $\pm$ SD)	AVE	CR
Fear of COVID-19 (FCOVID)	FC7	0,729	0,885	4,2457 ( $\pm$ ,02978)	0,52	0,90
	FC6	0,780				
	FC5	0,719				
	FC4	0,713				
	FC3	0,781				
	FC2	0,639				
	FC1	0,676				
Intention to Get COVID-19 Vaccinated (COVIDVI)	CVI1	0,677	0,663	3,7217 ( $\pm$ ,03940)	0,50	0,70
	CVI2	0,739				
Perceived Infectability (PI)	PI2	0,589	0,718	3,8030 ( $\pm$ ,02652)	0,31	0,79
	PI3	0,450				
	PI4	0,595				
	PI5	0,642				
	PI6	0,469				
	PI7	0,544				

As a result of the confirmatory factor analysis, the overall reliability coefficient was Alpha=0.885. Because  $0,60 \leq \alpha < 0,80$ , the scale is highly reliable. Ensuring validity and reliability demonstrates the existence of a structural relationship between fear of COVID-19,



perceived infectability, and intention to get vaccinated. The fair values were examined to show that the data fit the model well. Table 4 shows the results of the structural model.

**Table 4.** *The result of the structural model*

Hypothesis	Paths	Estimate	S.E.	C.R.	P	Result
<b>Effect of Fear of COVID-19 on Intention to Get COVID-19 Vaccinated (Before Mediation)</b>						
H <sub>1</sub>	COVIDVI <--- FCOVID	0,499	0,082	8,342	***	H <sub>1</sub> supported
<b>Effect of Fear of COVID-19 on Intention to Get COVID-19 Vaccinated (After Mediation)</b>						
H <sub>2</sub>	P.I. <--- FCOVID	0,809	0,070	11,405	***	H <sub>2</sub> supported with a full mediation
	COVIDVI <--- FCOVID	-0,083	0,159	-0,673	0,501	
	COVIDVI <--- PI	0,693	0,191	4,770	***	

The indirect relationship and its properties are shown in Table 5. 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 dependent variable (intention to get vaccinated) becomes insignificant and creates a whole mediation relationship. The structural model is illustrated in Figure 1.

**Table 5.** *An indirect effect of the model*

Indirect Path	Unstandardized Estimate	Standardized Estimate	p-value
FCOVID --> PI --> COVIDVI	0,724	0,561	0,501

## DISCUSSION

There was a statistically significant difference in Fear of COVID-19 score according to age (ANOVA test = 2,712; P < 0.05) and according to living with family (t-test = 3,213; P < 0.05). However, there was no significant relationship among the sex of the participants. Furthermore there was a statistically significant difference in perceived infectability score according to sex (t-test = 3,224; P < 0.05), according to age (ANOVA test = 5,661; P < 0.05) and according to living with family (t-test = 3,545; P < 0.05). Moreover there was a statistically significant difference in intention to get vaccinated score according to sex (t-test = 4,043; P < 0.05). However, there was no significant relationship between the age of the participants and living with the family of the participants.

Based on the above-mentioned theoretical premises and hypotheses, this study tested the mediating role of perceived COVID-19 infectability on attitudes towards vaccine purchase. In study, fear of COVID-19 (Ahorsu vd., 2020) has been proposed as a potential precursor to vaccination. However, it has been stated that this level of fear can be triggered by several mediating factors (Hayes, 2018) or by high levels of existential anxiety (van Bruggen vd., 2017). In addition, individuals may develop conspiracy theories that will inevitably reduce their intention to be vaccinated while coping with existential stress (Brotherton vd., 2013). As a result, on the one hand, fear of COVID-19 can positively influence the choice to get vaccinated; On the other hand, perceived COVID-19 infectability may take this positive relationship even further, with its mediating effect.

The results of our study showed the existence of a mediation model with direct and indirect effects on the intention to get vaccinated. 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 the anxiety of COVID-19 are related to getting the COVID-19 vaccine (Detox vd., 2020; Qiao vd., 2020). In addition, this study revealed the mediating effect of perceived COVID-19 infectability on the relationship between fear of COVID-19 and intention to get vaccinated. For this reason, it has been observed that when individuals experience anxiety, they can directly and rationally face proximal defences to eliminate dangerous stimuli such as vaccines.

Recent studies have shown that fear of COVID-19 is increasing worldwide (Knipe vd., 2020) and that high levels of fear of COVID-19 may be associated with anxiety, distress, and depression (Satici vd., 2020) and lead to more severe cases such as suicide (Dsouza vd., 2020). According to Rogers' (Rogers, 1975) theory of protection motivation, individuals tend to engage in more healthy behaviours in the presence of a health risk. Redken et al. (Reuken vd., 2020) emphasized that individuals with fear of COVID-19 tend to use personal protective equipment more frequently, wash their hands more regularly, and prefer remote medical consultations. These results are in line with the findings of Makhanova and Shepherd (Makhanova & Shepherd, 2020), showing that perceived infectability to diseases is associated with increased susceptibility to health and disease-related issues in the context of the COVID-19 pandemic.

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 perceived COVID-19 infectability on an individual's COVID-19 vaccine intake. This psychological factor is likely to contribute to individuals' intentions to get the COVID-19 vaccine. Furthermore (Pyszczynski et al., 2005), when death threatens, these dangers can be neutralized by activating the nearest security measures to reduce the sense of vulnerability. Therefore, advocacy involving proximal measures may lead people to make healthy choices, such as engaging in healthy behaviours (Arndt vd., 2003) or getting vaccinated.

In addition, this study revealed that perceived COVID-19 infectability is an essential factor in explaining individuals' intention to receive a COVID-19 vaccine. Supporting the conclusion of our study, according to the protection motivation theory, it has been argued that perceived vulnerability (for example, how one perceives the possibility of being infected) is triggered by fear, followed by an intention to protect (for example, receiving a COVID-19 vaccine) (Ling vd., 2019; Wang vd., 2021). Zhang et al. (Zhang vd., 2021) reported that Chinese workers with greater perceived behavioural control had a higher intention to get the COVID-19 vaccine. In addition, this finding is consistent with Wang et al. (Wang vd., 2021), contradicts the result found. More specifically, the perceived vulnerability was not associated with individuals' intention to get the COVID-19 vaccine. The reason for this is that the infection severity of COVID-19 is different in the two countries, and Wang et al. (Wang vd., 2021), it was concluded that the participants in the study had a low level of safety perception, which contributed to an insignificant relationship to be vaccinated.

## CONCLUSION

This study explored different ways to face 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 perceived COVID-19 infectability on individuals' COVID-19 vaccine intake. Furthermore, it has also been observed that when people consider the real risks of COVID-19 infection, their closest defensive behaviour may require rational choices, such as the intention to vaccinate as soon as possible.

The present study results should be carefully examined due to the following limitations. First, a cross-sectional study design was used in this study, which does not allow us to make cause-effect inferences. The ability of future study to replicate similar studies with other methodologies may provide more striking results. A second limitation is our example of unbalanced fitness by gender. According to Caci et al. (2019), convenience sampling plays an essential role in social science research. However, men view vaccination more positively than women. Therefore, our data collection method did not process and controlled this data. In the future, it is recommended to repeat the study by balancing the male-female ratio.

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