



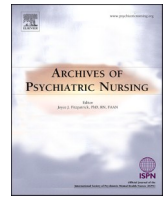
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The impact of fear of COVID-19 on the impact of event and indirect trauma^{☆,☆☆}

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ABSTRACT

This study investigated the mediating effect of fear of COVID-19 on the relationship between the impact of an event and indirect trauma during the pandemic. The study was conducted online from February 8 to 18, 2021, with 215 participants who had never been diagnosed with COVID-19. The collected data were analyzed using SPSS and PROCESS macro software. It was confirmed that fear of COVID-19 partially mediates the relationship between the impact of an event and indirect trauma. This means that the greater the degree of impact of COVID-19, the higher the level of indirect trauma. Additionally, the greater the fear of COVID-19, the higher the level of indirect trauma. These results indicate that the prolonged spread of COVID-19 may vary depending on the country's quarantine systems. Overall, the findings of this study can assist in understanding the psychological problems of people who have experienced COVID-19 and in preparing relevant countermeasures for emotional problems.

Introduction

The spread of diseases and an increase in the number of deaths because of large-scale infectious diseases cause fear in humans (Amsalem et al., 2021). The coronavirus disease 2019 (COVID-19)—first reported in Wuhan, China, has spread worldwide and caused numerous deaths. Countries are working to contain the spread of COVID-19 in various ways, including screening tests, vaccinations, and treating confirmed cases. However, as the COVID-19 pandemic persists, concerns about its worldwide spread and impact on mental health are increasing (Holmes et al., 2021). Additionally, with an increase in the number of Omicron-variant cases, fear of COVID-19 continues to grow.

Even though most people may not have directly experienced traumatic events such as the 9/11 terrorist attack or contracted infectious diseases such as SARS and MERS, they are repeatedly exposed to such events through the media, including TV and newspaper articles. Thus, they experience indirect trauma as if they were directly exposed to these events (Bride et al., 2004). That is, even if they have not experienced the event, they may experience post-traumatic stress symptoms such as re-experience, avoidance, and hyperarousal, like those who experienced

a traumatic event (Prekazi et al., 2021). The spread of COVID-19 has killed millions of people worldwide (WHO, 2022). Almost two years into the pandemic, COVID-19 still remains a shock to people. It has drastically changed our daily lives, as almost everyone wears a mask when they go outside.

Events related to communicable diseases such as COVID-19 are known to affect mental and psychological health (Bhuiyan et al., 2021). The spread of infectious diseases is reported to cause negative psychological states such as depression and anxiety, and studies have shown that mental health is threatened, by such things as fear, anxiety, and suicide, even during the spread of SARS or the Ebola virus (Poudel & Subedi, 2020). As such, social events, directly or indirectly, affect humans in various ways. These results were confirmed by Bridgland et al. (2021). People directly or indirectly exposed to COVID-19 had symptoms like those of post-traumatic stress disorder (PTSD), suggesting that indirect experiences with COVID-19 could also be linked to indirect trauma. Indirect trauma refers to signs and symptoms that resemble those of direct trauma found in people who have undergone traumatic events but have not directly experienced them (Bride et al., 2004). For example, during the COVID-19 pandemic, even though only some

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individuals were directly affected by COVID-19, those who did not get COVID-19 experienced trauma. Indirect trauma is divided into vicarious and secondary trauma (Jenkins & Baird, 2002), both of which are emotional responses experienced by people related to trauma survivors. Secondary trauma is the emotional duress experienced by people exposed to trauma survivors, such as family members and therapists, while vicarious trauma refers to the transformation of a helper's inner experience that results from forming a therapeutic alliance with a client's traumatic experiences (Gottfried, 2010; Jenkins & Baird, 2002; Pearlman & Saakvitne, 1995).

After the 9/11 terror attacks, interest in indirect trauma caused by media exposure increased as more people, despite having no direct traumatic experience, showed PTSD symptoms (Park et al., 2018). A study of nurses working in general hospitals after the MERS outbreak reported that those who had been in contact with suspected or diagnosed MERS patients showed more PTSD symptoms (Kim & Park, 2017). Kim et al. (2019) reported that the higher the fear of MERS, the worse the socio-psychological health and post-traumatic stress. Previous studies have confirmed that indirect trauma is influenced by various factors, such as past trauma experience, life stress and mental health, age, gender, exposure to visual data, and problem-solving ability (Di Crosta et al., 2020; Frankfurt et al., 2016; Jacob & Lambert, 2021). However, most studies related to indirect trauma have been conducted on specific groups, such as medical personnel and emergency medical technicians, who directly face or come into close contact with new infectious diseases (e.g., SARS, MERS, and COVID-19). Reports revealed that indirect trauma can empathize with the victim and experience the same emotions by hearing a detailed explanation of the frightening event (Sohn, 2014). As the pandemic continues, new COVID-19 variants continue to appear, and the number of confirmed cases is increasing. Given these circumstances, there is a need to study indirect trauma experienced by the general public who have no contact with confirmed patients or experience contracting the virus. Furthermore, it is necessary to establish strategies to respond to indirect trauma experienced by the general public in the long term. Therefore, it would be meaningful to investigate how emotional responses, such as fear of the impact of COVID-19, affect the indirect trauma of people who have never been infected.

Obtaining accurate information is difficult for those who are not in direct contact with COVID-19, such as medical personnel because much of the information about the contagiousness or risk of COVID-19 is not factually reported or is spread as fake news via social media. Indeed, the public's fear of COVID-19 has been exacerbated by the sheer number of fake news items spread via and across social media. Several studies have reported that excessive information or statistics, such as new daily deaths, can lead to mood disorders (Chan & Huak, 2004; Eun et al., 2005). Thus, understanding how the fear of COVID-19 affects indirect trauma is crucial in preparing for "living with COVID-19" and in establishing strategies to cope with similar social events and disasters in the future. Therefore, this study investigated the effect of fear of COVID-19 on the relationship between the impact of an event and indirect trauma. The hypotheses of this study are as follows.

Hypothesis 1. Impact of event is associated with indirect trauma due to COVID-19.

Hypothesis 2. Fear of COVID-19 mediates the relationship between the impact of an event and indirect trauma due to COVID-19.

Method

Participants

The participants were adults over the age of 20 who understood the purpose and methods of the study and agreed to participate. As the purpose of the study was to investigate the trend of indirect trauma caused by COVID-19, those who tested positive and were treated for

COVID-19 were excluded. Only those who had never contracted the virus were included in the study. The sample size was calculated using the G*Power 3.1.9.7 program (Heinrich Heine University, Dusseldorf, Germany). Based on multiple linear regression analysis with a significance level of 0.05, power of 90 %, 10 explanatory variables, and a medium effect size of 0.15, the minimum sample size required was 199 participants. A total of 215 participants were enrolled, considering a dropout rate of 10 %.

Procedures

Data were collected for three days from February 8 to 10, 2021, after receiving approval from Gyeongsang National University's Institutional Review Board (GIRB-A20-Z-0060). An online survey company collected the data for analysis; only adults who read the guidelines and agreed to participate in the study took the survey, which took approximately 20 min to complete.

At the time of the survey, Korea had implemented nationwide social distancing measures to contain the spread of COVID-19 before elementary, middle, and high schools began their new semesters. Thus, in compliance with Korea's quarantine guidelines, an online survey company conducted the survey. South Korea is divided into 17 first-tier administrative districts based on the population. The online survey company collected data from these districts targeting subjects who wanted to participate in this study. Korea has a national health insurance system run by the government. Therefore, all participants belonged to one health care system because the state covered all costs related to testing and treating COVID-19 during the survey period. The participants were informed that they could withdraw from the survey at any time. There were questions with clear answers, and those who gave incorrect answers were inevitably rejected from the survey because of a lack of credibility.

Measures

Impact of Event Scale

Considering the need for a tool to measure psychological pain experienced after trauma, Eun et al. (2005) adapted the Impact of Event Scale (IES) developed by Horowitz et al. (1979) and reviewed its reliability and validity. This scale was designed to assess the degree of subjective distress related to a specific traumatic event. The scale comprised items such as "I remember the incident even if I do not want to think about it" and "I felt sensitive and angry after the incident." It comprises intrusion and avoidance subscales among PTSD symptoms. Responses were evaluated on a four-point scale (1 = not at all, 4 = often). In the present study, the reliability of the IES was 0.84.

Fear of COVID-19 Scale

The scale validated by Ahorsu et al. (2020) was adapted and used to measure fear of COVID-19. The Fear of COVID-19 Scale (FCV-19S) comprises seven items rated on a five-point scale (1 = strongly disagree, 5 = strongly agree). The scale items comprise items such as: "It makes me uncomfortable to think about COVID-19" and "I cannot sleep because I'm worried about getting COVID-19." The reliability of this study was 0.89.

Indirect trauma

The Indirect Trauma Scale (ITS) developed and validated by Hur and Rhee (2017), was used to measure indirect trauma. It comprises four sub-variables and 21 items. Each item is rated on a five-point scale (0 = strongly disagree; 4, strongly agree), with higher scores indicating a higher likelihood of experiencing indirect trauma from a social disaster. The scale items include "Somehow scary and unpleasant" and "I became wary of situations, objects, and people similar to the incident." The reliability of this study was 0.81.

Data analysis

Frequency, correlation, and regression analyses were performed using SPSS 26.0 Mac. Furthermore, the mediating effect was measured using *Baron and Kenny's (1986)* three-step procedure and Model 4 of PROCESS macro-4.0, with 5000 bootstrap bias-corrected 95 % confidence intervals (*Hayes, 2013*).

Results

Participants' general characteristics

A total of 215 participants participated in this study: 109 men (50.7%) and 106 women (49.3%). In terms of age, those under 30 or 30–39 years old were 65 (30.2%), respectively, 58 (27.0%) aged 40–49, and 27 (12.6%) aged 50 years or older. As for education, 29 people (13.5%) had a high school diploma or less and 186 (86.5%) had a university degree or higher. The income status of the participants included 27 in the upper level (12.6%), 116 in the middle level (54.0%), and 72 in the lower level (33.4%). Eighty-five participants (39.5%) answered that their work environment had changed due to telecommuting. In terms of occupation, there were 99 office workers (46.1%), 14 self-employed (6.5%), 30 professional and technical workers (14.0%), 36 students (16.7%), and 36 people who were day laborers (16.7%) (*Table 1*).

Correlation analysis between variables

Correlation analysis was performed on IE, FCV-19, and ITS to examine the correlations between the variables (*Table 2*).

Results of mediation analysis

Table 3 shows the results, confirming the effect of an event's impact on indirect trauma. In the analysis of the effect of the impact of an event (independent variable) on indirect trauma (dependent variable), the F-value was significant at 142.44 ($p < .001$) and the explanatory power of the model was 23.5 %, showing that the regression model was a good fit. The β value (0.49) was significant ($p < .001$), and, as a bootstrapping estimate, there was no zero between the minimum (0.33) and maximum coefficient (0.54) within the confidence interval, confirming that the relationship between the variables was significant.

Table 1
Participants' general characteristics (N = 215).

Variables	Categories	N (%)
Gender	Male	109 (50.7)
	Female	106 (49.3)
Age	<30	65 (30.2)
	30–39	65 (30.2)
	40–49	58 (27.0)
	>50	27 (12.6)
Education level	≤High school	29 (13.5)
	≥College	186 (86.5)
Perceived economic status	High	27 (12.6)
	Middle	116 (54.0)
Changes in work environment after COVID-19	Low	72 (33.4)
	Yes	85 (39.5)
	No	130 (60.5)
Occupational group	Office worker	99 (46.1)
	Self-employed	14 (6.5)
	Professional, technical worker	30 (14.0)
	Student	36 (16.7)
	Day laborer	36 (16.7)

Table 2

Correlation analysis between variables.

Variables	M	SD	1	2	3
1. Impact of event	52.6	15.3			
2. Fear of COVID-19	36.2	10.9	0.680**		
3. Indirect trauma	48.1	13.6	0.485**	0.505**	

Analyzing the effect of the impact of an event (independent variable) on fear of COVID-19 showed that the F-value was significant at 183.56 ($p < .001$), and the explanatory power of the model was 46.3 %, indicating that the regression model was a good fit. The β value (0.49) was significant ($p < .001$), and, as a bootstrapping estimate, there was no zero between the minimum (0.41) and maximum coefficient (0.56) within the confidence interval, confirming that the relationship between the variables was significant.

The analysis of the effect of the impact of the event (independent variable) and fear of COVID-19 (parameter) on indirect trauma (dependent variable) showed that the F-value was significant at 43.82 ($p < .001$), and the explanatory power of the model was 29.3 %, indicating that the regression model was a good fit. The β value (0.26) was significant ($p < .001$). Regarding the relationship between fear of COVID-19 and indirect trauma ($p < .001$), the β value (0.33) was also significant. Additionally, as a bootstrapping estimate, there was no zero between the minimum and maximum coefficient values within the confidence interval, confirming that the relationship between the variables was significant.

Finally, statistical analysis was conducted to confirm the mediating effect of fear of COVID-19 on the relationship between the impact of an event and indirect trauma. The significance of an indirect effect can be confirmed by the presence of zero in the confidence interval (*Table 4*). The analysis revealed that the lower limit confidence interval within the confidence interval was 0.09 and the upper limit confidence interval was 0.30, which did not include zero in the 95 % confidence interval; thus, the indirect effect was statistically significant (*Fig. 1*).

Discussion

Two years have passed since the COVID-19 outbreak, which has dramatically changed our lives. Tens of millions of people contracted the virus and received treatment, resulting in millions of deaths (WHO, <http://covid19.who.int>). In Korea, masks have become a part of daily life and wearing masks has become a norm. Considering these circumstances, COVID-19 may become a traumatic event for the general public, and people may experience psychological and emotional reactions even if they have not been infected. Therefore, this study examined how fear of COVID-19 affected the relationship between the impact of an event and indirect trauma. The results showed that fear of COVID-19 partially mediates the relationship between the impact of an event and indirect trauma.

This study confirmed that the greater the impact of an event, the higher the level of indirect trauma. *Um et al. (2017)* reported that 26.6 % of doctors who worked in or treated patients at hospitals with MERS exhibited depressive symptoms and 7.8 % suffered from PTSD symptoms. Additionally, in a study on SARS, 27.5 % of the medical staff showed depressive symptoms, and 3.1–10 % of them suffered from PTSD symptoms, indicating that the prevalence of infectious diseases is an impact of event factors (*Alshukairi et al., 2018; Chan & Huak, 2004; Su et al., 2007*). Furthermore, a study on healthcare and emergency workers also reported that medical staff experienced a higher level of stress than first responders and that the COVID-19 treatment staff were exposed to a lot of stress and had a high possibility of secondary trauma (*Vagni et al., 2020*). *Holmes et al. (2021)* reported high burnout and secondary trauma among social workers because of COVID. Until now, most studies on the impact of events and PTSD symptoms related to infectious diseases have focused on groups that had direct contact with

Table 3
Mediation effect of fear of COVID-19 on the relationship between impact of event and indirect trauma.

	Step 1 (Model 1)				Step 2 (Model 2)				Step 3 (Model 3)			
	IE → FCV				IE → IT				IE, FCV → IT			
	β	SE	t	p	β	SE	t	p	β	SE	t	p
Fear of COVID-19	0.49	0.04	13.55	<.001	0.49	0.05	8.09	<.001	0.26	0.07	3.33	.001
R ²	0.463				0.235				0.293			
F(p)	183.56 (p ≤ .001)				142.44 (p ≤ .001)				43.82 (p ≤ .001)			

Note. IE = impact of event; IT = indirect trauma; FCV = fear of COVID-19.

Table 4
Verifying the bootstrapping mediation effect.

Fear of COVID-19	Effect	SE	LLCI	ULCI	t	p
Total effect	0.43	0.05	0.33	0.54	8.09	<.001
Direct effect	0.20	0.05	0.10	0.37	3.33	.001
Indirect effect	0.23	0.07	0.09	0.30		

or were highly likely to come into contact with confirmed cases. A study by Li et al. (2020) on active Weibo users reported that individuals showed higher levels of depression and anxiety after COVID-19, and their sensitivity to social risks was higher than before the outbreak. Considering that most COVID-19 patients are ordinary people, not medical staff, it is important to explore the general public's experience of and response to COVID-19, as was done by Li et al. (2020). Given the findings (Adams et al., 2006) that mental health experts suffered from serious emotional problems and psychiatric symptoms during or after the SARS outbreak, the relationship between COVID-19 and indirect trauma is confirmed as the impact of an event is significant in setting directions to respond to COVID-19 in the future.

This study confirmed that the greater the fear of COVID-19, the higher the level of indirect trauma. The participants in this study were ordinary people who had never tested positive for COVID-19, and most of them were not associated with confirmed cases. The results of this study indicate that fear of COVID-19 can arise through information related to COVID-19 from media channels and that emotional responses may lead to indirect trauma. Furthermore, this study's findings corroborate those of Khattak et al. (2021) who reported that nurses' fear of COVID-19 affected secondary trauma, psychological distress, and turnover intention. Additionally, a study by Blanco-Donoso et al. (2021) on nursing home workers confirmed that high workload, social pressure from work, and fear of contamination affect secondary trauma in the

COVID-19 situation. It has been reported that people who have experienced anxiety, fear, or helplessness because of SARS in the past are more likely to develop PTSD and have lower levels of mental health (Lau et al., 2005). An appropriate level of fear or stress can also be expected to have a positive effect, promoting preventive actions against those that cause such a psychological state. However, as COVID-19 is a new infectious disease that has been going on for a long time and has a high fatality rate, previous studies revealed that fear of the disease can increase the severity of trauma.

Finally, it was confirmed that fear of COVID-19 partially mediated the relationship between the impact of an event and indirect trauma. Traumatic events accompany emotional responses such as anxiety, depression, and anger, and direct traumatic experiences can lead to PTSD symptoms (Brooks et al., 2020). In the case of social events or infectious diseases, people hear/read daily reports in the media of COVID-19's impact and spread, which can act as an impact of event factors, even for those who have never been confirmed as infected. Currently, oral antiviral drugs to treat COVID-19 have been developed recently (FDA, 2022), but many deaths still occur (WHO, 2022), and despite a high vaccination rate, breakthrough infections and side effects have been reported. Furthermore, various risk factors related to COVID-19, such as social distancing because of the increase in the number of confirmed cases, may induce emotional responses such as anxiety and fear, leading to indirect trauma.

These results are consistent with those of previous studies showing that indirect experience of a traumatic event can lead to indirect trauma. According to a study by Holmes et al. (2021) on social workers in the US, 16.22 % reported severe grief symptoms, and 49.59 % experienced secondary trauma. A study by Giusti et al. (2020) on health professionals similarly reported psychological problems such as clinical levels of depression (31.3 %), anxiety (34.3 %), and stress (36.7 %) because of the COVID-19 pandemic, showing that the impact of COVID-19 leads to

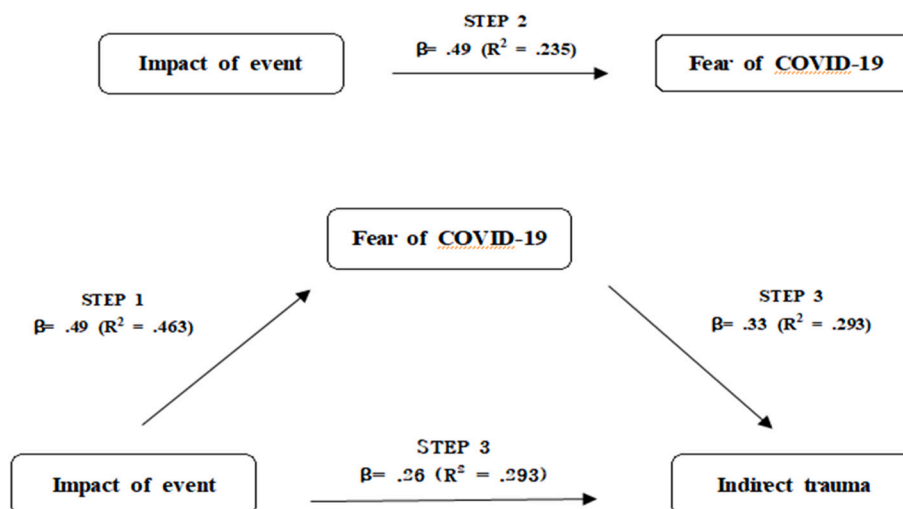


Fig. 1. Path diagram of a model.

emotional problems such as depression, anxiety, and indirect trauma.

Limitations and directions for future research

The survey in this study was conducted in early 2021, approximately a year after the pandemic was declared. The participants were ordinary people who had adapted to COVID-19 to some extent and had never tested positive. Thus, there may be limitations to generalizing the results because they depend on the time, such as immediately after the pandemic and during the COVID-19 phase, quarantine guidelines, and cultural characteristics of each country. Since the survey was conducted with people who participated voluntarily, it is likely that people who had experienced a great deal of incident shock or indirect trauma did not participate in the survey; therefore, generalization is somewhat limited. However, owing to the similarity between the event shock scale and the characteristics of indirect trauma, this study has limitations in generalization because of the overlapping of some items. Additionally, the causes of the COVID-19 impact experienced by the general public may vary depending on, for example, the media, occupational characteristics, and the confirmed infection of people around them. In Korea, people acquire information through various media channels such as emergency text alerts, TV news, and social media. However, it is difficult to pinpoint one route because most people use multiple channels. Therefore, it is difficult to rule out the possibility that the information acquisition route affected indirect trauma. Further research on these factors is required. Furthermore, indirect trauma is not diagnosed as a psychiatric disorder but may show symptoms equivalent to PTSD. Therefore, further research should be performed on therapeutic approaches, such as counseling and psychotherapy, including an effectiveness evaluation, as well as on factors affecting indirect trauma during the COVID-19 pandemic.

Conclusion

This study investigated the mediating effect of the fear of COVID-19 on the relationship between the impact of an event and indirect trauma. As a result of confirming the impact of the event, fear, and indirect trauma of COVID-19 on ordinary people who had not contracted the virus, fear of COVID-19 was found to partially mediate the relationship between the impact of an event and indirect trauma. These results can help address people's mental health problems in the future "living with COVID-19" era.

Declaration of competing interest

The authors declare no conflicts of interest.

Acknowledgments

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