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Psychometric Testing of Three COVID-19-Related Scales Among People with Mental Illness

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Abstract

Background/Objective: Fear of novel coronavirus 2019 (COVID-19) may result in psychological health problems among different populations. Moreover, believing COVID-19 information and preventive COVID-19 infection behaviors are relevant constructs associated with fear of COVID-19. Therefore, the present study validated three instruments assessing fear, beliefs, and preventive behaviors related to COVID-19 among individuals with mental illness. Moreover, relationships between the three constructs were examined. **Methods:** Individuals with mental illness (N=400; 178 females; *Mean* age=46.91 years) completed the Fear of COVID-19 Scale (FCV-19S), Believing COVID-19 Information Scale (BCIS), Preventive COVID-19 Infection Behaviors Scale (PCIBS), and Depression Anxiety Stress Scale-21 (DASS-21). **Results:** The FCV-19S, BCIS, and PCIBS demonstrated a single-factor structure with satisfactory fit indices. Moreover, believing COVID-19 information positively and significantly associated with fear of COVID-19, fear of COVID-19 negatively and significantly associated with preventive behaviors and positively and significantly associated with psychological distress. **Conclusions:** The FCV-19S, BCIS, and PCIBS may assist healthcare providers in assessing COVID-19 related information among individuals with

mental illness. Consequently, relevant programs may be designed to help individuals with

mental illness going through the period of crisis.

Keywords: behavior; COVID-19; fear; psychological distress; instrumental study

Introduction

With the increasing novel coronavirus 2019 (COVID-19) infection and climbing

mortality due to COVID-19 worldwide (World Health Organization [WHO], 2020a), fear of

COVID has been reported, especially in the countries with a great number of confirmed cases.

For example, an Iranian study reported that 717 Iranians recruited from general population

reported their fear as being 3.9 out of 5 utilizing a five-point Likert scale (Ahorsu et al., 2020).

More recently, a Bangladeshi study found that 8550 Bangladeshi individuals from general

population reported their fear as 3.1 out of 5 (Sakib et al., 2020) using the same instrument as

that in Ahorsu et al.'s (2020) study. The higher levels of fear found in Iran may be due to

COVID-19 situation being more serious in Iran: as of April 26, 2020, Iran is the seventh

leading country in total reported cases of COVID-19 with a total of 89,328 confirmed cases

and 5,650 deaths compared to significantly 5,142 cases and 145 deaths in Bangladesh

(Worldmeter, 2020). Although a lower level of fear was found among Bangladeshi

individuals, some extreme cases with great fear of COVID-19 have been observed. For

instance, a 36-year-old Bangladeshi man committed suicide because of suspected COVID-19

infection that he did not actually have (Mamun & Griffiths; 2020). A similar situation was

described in India where a 50-year-old father with three children committed suicide because

he had COVID-19-like symptoms but again did not actually have the virus (Goyal, Chauhan,

Chhikara, Gupta, & Singh, 2020). Therefore, a validated instrument to assess fear of

COVID-19 among different populations at the present time is of great utility.

To the best of the present authors' knowledge, only one specific instrument has been

developed to assess fear levels toward COVID-19, i.e., the Fear of COVID-19 Scale
(FCV-19S). The FCV-19S was developed by Ahorsu et al. (2020) who carried out testing
using exploratory factor analysis and demonstrated the scale had very good psychometric
properties. Sakib et al. (2020) translated the FCV-19S into Bangla and verified its robust
psychometric properties using confirmatory factor analysis (CFA). Moreover, Soraci et al.
(2020) and Satici et al. (2020) translated the FCV-19S into Italian and Turkish respectively
and found that these translated versions had satisfactory psychometric properties. Apart from
the four aforementioned studies (Ahorsu et al., 2020; Sakib et al., 2020; Satici et al., 2020;
Soraci et al., 2020), no other psychometric information concerning the FCV-19S has been
reported at the present time. Moreover, the four FCV-19S psychometric testing studies all
focused on general populations (Ahorsu et al., 2020; Sakib et al., 2020; Satici et al., 2020;
Soraci et al., 2020) and it remains unclear whether the FCV-19S can be applied to
non-normative populations (e.g., individuals with mental illness). As a robust instrument
needs to have satisfactory psychometric properties across different populations (Lin, Yang,
Lai, Su, & Wang, 2017; Lin, Hwang, et al., 2019) to accumulate its scientific rigor, the
present authors believe that validating the FCV-19S among individuals with mental illness is
therefore essential. More specifically, individuals with mental illness are more vulnerable
than general population with regards their psychological health (Chang, Wu, Chen, & Lin,
2016; Su, Ng, Yang, & Lin, 2014).

In addition to the issue of fear of COVID-19, COVID-19 information and preventive
COVID-19 infection behaviors are also of great concern. Moreover, fear of COVID-19,
COVID-19 information, and preventive COVID-19 infection behaviors appear to be
interrelated. Fear may blind an individuals' logical thinking and facilitate their
unreasonable/maladaptive behaviors (Lin, 2020; Pakpour & Griffiths, 2020; Ren, Gao, &
Chen, 2020) such as the two aforementioned suicide cases (Goyal et al., 2020; Mamun &

Griffiths; 2020). However, an underlying reason for individuals to engage in extreme behavior (e.g., suicide) may be the misinformation they receive. More specifically, individuals are keen to obtain information about dangerous health conditions from different sources, especially social media, during outbreak periods (Shin et al., 2016; Wang, Pan, et al., 2020). Unfortunately, some information reported in social media is incorrect. A recent study utilizing the general public in two countries (UK and the USA) found that some misconceptions and falsehoods are believed and circulated on social media (Geldsetzer, 2020). Moreover, even accurate information reported on the social media can be frightening (e.g., the rapid growth of death cases). Therefore, misconceptions and misbeliefs concerning COVID-19, or even accurate COVID-19 information may trigger and amplify individuals' fear and subsequently leading to psychological distress and inappropriate behaviors. Consequently, the present authors hypothesized that individuals who have a greater level of fear concerning COVID-19, will be more prone to engaging in inappropriate behaviors rather than engaging in preventive COVID-19 infection behaviors.

Although beliefs about COVID-19 information and preventive COVID-19 infection behaviors appear to be important factors underlying the fear of COVID-19, no validated instruments have been developed to assess either beliefs concerning COVID-19 information (especially information obtained from social media) or preventive COVID-19 infection behaviors. Therefore, the present study also developed and validated instruments assessing beliefs in COVID-19 information from social media and preventive COVID-19 infection behaviors for future studies' use. More specifically, commonly used social media (as well as other online and offline media) were used in the present study to develop an instrument to assess an individual's belief in COVID-19 information. The preventive COVID-19 infection behaviors proposed by the World Health Organization (WHO, 2020b) were used to construct an instrument to assess an individual's preventive behaviors. With the development and

validation of the two instruments, healthcare providers and researchers would be able

quantify the beliefs and preventive behaviors of an individuals' psychological and behavioral

reactions to COVID-19.

In order to better capture the impacts of COVID-19 among individuals with mental

illness, the present study validated three COVID-19-related instruments, i.e., the FCV-19S,

the Believing COVID-19 Information Scale (BCIS), and the Preventive COVID-19 Infection

Behaviors Scale (PCIBS). All three instruments were hypothesized to be unidimensional and

their single-factor structures were tested using CFA. Item properties and internal consistency

of the three instruments were also examined. In addition to the psychometric properties, the

present study proposed a preliminary path model to examine the relationships between fear of

COVID-19, beliefs in COVID-19 information from social media, preventive COVID-19

infection behaviors, and psychological distress. In the preliminary path model, several

hypotheses were proposed: (i) believing COVID-19 information from social media will lead

to greater fear of COVID-19; (ii) fear of COVID-19 will lead to fewer preventive COVID-19

infection behaviors; and (iii) fear of COVID-19 will lead to greater psychological distress,

including depression, anxiety, and stress.

Methods

Participants and recruitment procedure

The present cross-sectional study was conducted after many hospitals and clinics in

Taiwan had already tightened their regulations to avoid unnecessary contact between medical

personnel and patients as well as outside visitors because of COVID-19 pandemic. It was

approved by the Institute of Review Board (IRB) of the Jianan Psychiatric Center (JPC),

Ministry of Health and Welfare (IRB numbers: 19-034). To facilitate protection of privacy for

patients with mental illness, the participants were recruited at their most convenient locations,

namely, the JPC. The JPC is the sole psychiatric teaching center in a city of southern Taiwan

(i.e., Tainan). The JPC has a psychiatric treatment network in southern Taiwan and therefore provides a service to the entire southern Taiwan region with more than three million residents. Thousands of individuals with mental illness receive different program services from the JPC, including inpatient rehabilitation programs, daycare programs, and outpatient services. At the start of the present study's recruitment, the agency implemented dynamic measures including fever screening, health declarations, contact, and travel history check of both patients and medical personnel before entry into the JPC. Also, visits to patients, including relatives, being hospitalized even for psychiatric rehabilitation were banned in order to prevent a cluster outbreak of COVID-19. All eligible participants were recruited from the daycare, outpatient units, and inpatient rehabilitation programs between March 23 and April 23, 2020. The inclusion criteria included: (i) at least one diagnosis of mental disorder by at least one psychiatrist using the DSM-IV (fourth edition of Diagnostic and Statistical Manual of Mental Disorders) criteria; (ii) had sufficient mental capacity to provide consent and complete the assessments, (iii) admission to the daycare or inpatient rehabilitation programs or regular follow-up during outpatient treatment, indicating that the patient had a relatively stable condition (e.g., psychiatric symptoms were residual or non-active); and (iv) being aged over 20 years. The exclusion criteria were having: (i) a severe and unstable medical disease or a history of neurological disease; and (ii) a history of head injury. The total number of participants that took part in the study was 400 (178 females).

Measures

Fear of COVID-19 Scale (FCV-19S). The FCV-19S includes seven items with a 5-point Likert scale (1=strongly disagree; 5=strongly agree) to assess how an individual fears COVID-19. A higher score of the FCV-19S represents a greater level of fear toward COVID-19. An example item of the FCV-19S is "I cannot sleep because I'm worrying about getting coronavirus-19". The satisfactory psychometric properties of the FCV-19S have been

demonstrated in a general Iranian population (e.g., Cronbach's α=0.88; Ahorsu et al., 2020).

A higher score indicates a greater fear of COVID-19. The translation of FCV-19S was

performed following cognitive interviews. More specifically, the translated FCV-19S was

modified after several experts (including a psychiatrist, a public health expert, and an

orthopedist) reviewed it with comments. Therefore, the scale's linguistic validity was

ensured.

Believing COVID-19 Information Scale (BCIS). The BCIS comprises six items responded on

a five-point Likert scale (1=strongly disbelieve; 5=strongly believe) that assesses how

individuals believe the COVID-19 information they obtain. A higher score of the BCIS

indicates a greater level of believing in the obtained COVID-19 information. The BCIS items

share the same item stem of "How much do you believe in the COVID-19 information on…"

with different media sources added to the item stems. The six sources (with a much heavier

emphasis on social media sources) were *LINE* chat room, *LINE* news page, Facebook, online

news, television, and traditional newspaper. *LINE* and Facebook were used in the BCIS

because they are the most frequently used online social media among Taiwanese

(NapoleanCat, 2018; Statista, 2018).

Preventive COVID-19 Infection Behaviors Scale (PCIBS). The PCIBS was developed

according to the preventive behaviors recommended by the WHO (2020b). The WHO advises

individuals worldwide to engage in these behaviors to avoid COVID-19 infection. The

PCIBS comprises five items responded to on a five-point Likert scale (1=almost never;

5=almost always) and assesses how individuals perform preventive COVID-19 infection

behaviors. A higher score of the PCIBS indicates performing preventive behaviors more

frequently. An example item of the PCIBS is "I stay home more when I feel unwell".

Depression Anxiety Stress Scale-21 (DASS-21). The DASS-21 comprises 21 items that are

responded to on a four-point Likert scale (0=never; 3=almost always) and assesses three

types of psychological distress among individuals (depression, seven items; anxiety, seven items; and stress, seven items). Higher scores on each subscale of the DASS-21 indicate a greater level of depression, anxiety, or stress. Example items in the DASS-21 include "I felt that I had nothing to look forward to" (depression), "I felt that I was close to panic" (anxiety), and "I tended to overreact to situations" (stress). Satisfactory psychometric properties of the DASS-21 have been demonstrated in different populations, including individuals with mental illness (e.g., Cronbach's α=0.81 to 0.85) (Lee et al., 2019). The internal consistency of the DASS-21 subscales in the present study were satisfactory: α=0.90 (depression subscale), 0.85 (anxiety subscale), and 0.89 (stress subscale).

Background information. The participants were also asked to provide information concerning their age, gender, educational year, and where they obtained COVID-19 information (with selections of *LINE* chat room, *LINE* news page, Facebook, online news, television, traditional newspaper, and healthcare providers). Participants' mental illness diagnoses were retrieved from their medical records.

Data analysis

Background information of the participants was analyzed using descriptive statistics, including *means*, *SDs*, *frequencies*, and *percentages*. Internal consistency of the three COVID-19 instruments (i.e., FCV-19S, BCIS, and PCIBS) was examined using Cronbach's α. Item properties of the three COVID-19 instruments were checked by *skewness*, *kurtosis*, *percentage* of missing responses, *floor effect*, *ceiling effect*, *corrected item-total correlation*, and *factor loading*. Factor loadings of the instruments' items were retrieved from the CFA for each instrument.

The three COVID-19 instruments were all unidimensional. Consequently, a single-factor structure was tested for each instrument when performing the CFAs. Diagonally weighted least square estimation was used because all the instruments adopted a Likert-type scale for

item responses. Fit indices of *comparative fit index* (*CFI*> .9 indicates acceptable), *Tucker-Lewis index* (*TLI*> .9 indicates acceptable), *root mean square error of approximation* (*RMSEA*< .08 indicates acceptable), and *standardized root mean square residual* (*SRMR*< .08 indicates acceptable) were used to examine whether the single-factor structure of each instrument was supported (Lin, Fung et al., 2019; Yam et al., 2019).

Apart from the CFA, a hypothesized path model was investigated using structural equation modeling (SEM). The hypothesized path model proposed that believing in COVID-19 information from social media was likely to increase an individual's fear of COVID-19 because prior research reports misconceptions and misinformation among social media (Geldsetzer, 2020). Moreover, fear of COVID-19 was hypothesized to lead to decreased preventive behavior and increased psychological distress because prior research reports that fear may cause inappropriate behaviors (Lin, 2020; Ren et al., 2020) and psychological distress (Wang, Pan et al., 2020; Xiao, Zhang, Kong, Li, & Yang, 2020). In the hypothesized path model, no measurement structure was used to satisfy the principal of parsimony. Therefore, total scores of BCIS, FCV-19S, and PCIBS and subscale scores of depression, anxiety, and stress in the DASS-21 were used as observed variables in the path model via SEM. Age, gender, and educational year were controlled for in the model. All the statistical analyses were performed using R software, including the R packages of *lavaan* (Rosseel, 2012) and *psych* (Revelle, 2019). More specifically, the *lavaan* package was used for CFA and SEM.

Results

The *mean* age of the participants was 46.91 years (*SD*=10.92) (Table 1). Slightly less than half of the participants (*n*=178; 44.5%) were females and the majority diagnosis for the participants was schizophrenia (*n*=242; 60.5%). Most of the participants obtained information about COVID-19 via television (*n*=347; 86.8%).

(Insert Table 1 here)

The three COVID-19 instruments had very good to excellent internal consistency (α=0.93 for FCV-19S, α=0.91 for BCIS, and α=0.82 for PCIBS). Table 2 presents the item and scale properties of the FCV-19S, BCIS, and PCIBS. All the item and total scores were nearly normal distributed: FCV-19S (*skewness*=-0.14 to 0.47; *kurtosis*=-1.19 to -0.63), BCIS (*skewness*=-0.61 to -0.06; *kurtosis*=0.43 to 1.36), and PCIBS (*skewness*=-0.84 to -0.31; *kurtosis*=-0.92 to 0.08). Almost no missing values were found in the three instruments. The *floor* and *ceiling effects* were acceptable for all three COVID-19 instruments: FCV-19S (*floor effect*=12.0% to 27.8%; *ceiling effect*=1.3% to 14.3%), the BCIS (*floor effect*=1.8% to 7.8%; *ceiling effect*=4.3% to 16.0%), and the PCIBS (*floor effect*=2.3% to 13.0%; *ceiling effect*=10.0% to 31.8%). The *corrected item-total correlations* for all items were strong: (FCV-19S=0.69 to 0.85; BCIS=0.71 to 0.83; PCIBS=0.66 to 0.70) and *factor loadings* (FCV-19S=0.68 to 0.84; BCIS=0.69 to 0.83; PCIBS=0.65 to 0.71).

(Insert Table 2 here)

In addition to the strong loadings, all the fit indices support the uni-dimensionality of all three COVID-19 instruments: FCV-19S (*CFI*= .994, *TLI*= .992, *RMSEA*= .056, and *SRMR*= .057), BCIS (*CFI*= .994, *TLI*= .989, *RMSEA*= .042, and *SRMR*= .064), and PCIBS (*CFI*=1.000, *TLI*=1.006, *RMSEA*= .000, and *SRMR*= .027). Therefore, the single-factor structure for all three instruments was confirmed (Table 3). After ensuring that the psychometric properties of the FCV-19S, BCIS, and PCIBS were satisfactory, the hypothesized path model examined the relationships between believing in COVID-19 information, fear of COVID, preventive behaviors, and psychological distress (Figure 1). The hypothesized directions were supported in the path model. Believing COVID-19 information positively and significantly associated with fear of COVID-19 (standardized coefficient [β]= .28, p< .001), fear of COVID-19 negatively and significantly associated with preventive

behavior (β= -.11, p= .03) and positively and significantly associated with psychological distress (β= .31 for depression;=0.33 for anxiety;= .29 for stress; p-values< .001).

(Insert Table 3 and Figure 1 here)

Discussion

The present study found that the three newly developed COVID-19-related scales (i.e., FCV-19S, BCIS, and PCIBS) had satisfactory psychometric properties among a sample of individuals with mental illness. Their single-factor structures were confirmed by the CFAs and their item properties were promising in terms of the normal distribution, strong corrected item-total correlations, high factor loadings, and acceptable ceiling and floor effects. Moreover, the results of preliminary path model fully supported the present study's hypotheses. More specifically, the model showed that among the present sample (i) beliefs in COVID-19 information from social media had significant positive correlation with fear of COVID-19, and that (ii) the fear of COVID-19 was significantly associated with fewer preventive COVID-19 infection behaviors and greater psychological distress, including depression, anxiety, and stress.

Compared to previous studies psychometrically testing the FCV-19S (Ahorsu et al., 2020; Sakib et al., 2020; Satici et al., 2020; Soraci et al., 2020), the present findings demonstrate similar results, especially the single-factor structure of the FCV-19S. The participants' characteristics were different between these studies. The present study recruited individuals with mental illness (*Mean* age=46.91 years [*SD*=10.92]) in Taiwan, whereas Ahorsu et al. (2020) studied the Iranian general population (*Mean* age=31.25 years [*SD*=12.68]), Sakib et al. (2020) studied the Bangla general population with a relative younger age (*Mean* age=26.53 years [*SD*=9.09]), Soraci et al. (2020) studied the Italian general population predominantly females (*Mean* age=34.5 years [*SD*=12.21]), and Satici et al. (2020) studied the Turkish general population also predominantly females (*Mean*

age=29.47 years [*SD*=10.54]). Therefore, the FCV-19S can be tentatively concluded to be validated across populations with different features and FCV-19S may be used for cross-cultural comparisons. However, it is unclear whether measurement invariance across cultures is supported for FCV-19S. Additional evidence is needed for this psychometric property.

In general, the level of fear of COVID-19 was relatively low in the present study's sample (*Mean*=2.63 out of 5) as compared with Iranian (*Mean*=3.9) and Bangladeshi (*Mean*=3.1) samples. The relatively low score in FCV-19S for the present study's sample may be due to Taiwan's successful policy concerning COVID-19 infection control (Wang, Ng, & Brook, 2020). More specifically, the Taiwan government implemented their infection control policy before the World Health Organization recognized the worldwide danger of COVID-19. For example, by January 5, 2020, any individuals who had traveled to Wuhan in the previous 14 days were screened to see if they had symptoms of an upper respiratory tract infection (e.g., coughing) or fever at the point of entry. Quarantined policy was also implemented and applied to the travelers displaying fever or coughing symptoms (Wang, Ng et al., 2020). Later on, when the World Health Organization acknowledged the seriousness of the COVID-19, the Taiwan National Health Command Center, an institution established after the SARS outbreak (Wang, Ng et al., 2020), collaborated with various ministries (e.g., the ministries of transportation, economics, labor, and education) to counteract the global public health crisis in a comprehensive effort. Therefore, Taiwan is one of the few countries that did not officially cancel schooling or shut down business and had relatively few confirmed cases (cumulative total 428 cases as of April 24, 2020) (Taiwan Centers for Disease Control, 2020). Therefore, the present participants, even though they were a vulnerable population, might have felt safer during the COVID-19 pandemic period (compared to other countries) and subsequently reported relatively low levels of fear.

The hypotheses tested in the preliminary path model were fully supported by the SEM results. The relationship between fear of COVID-19 and psychological distress is aligned with prior findings (Ahorsu et al., 2020; Sakib et al., 2020; Satici et al., 2020; Soraci et al., 2020). However, to the best of the present authors' knowledge, the present study is the first to identify the relationship between believing more in COVID-19 information from social media, greater fear of COVID-19, and fewer preventive COVID-19 infection behaviors. Therefore, the present study provided empirical evidence to support prior claims that COVID-19 information irrespective of whether it was correct or incorrect information may have negative effects on an individual's mood and emotions (Ahorsu et al., 2020; Lin, 2020). With a stronger belief in COVID-19 information, an individual may have increased fears and tend to use inappropriate behaviors rather than positive behaviors (i.e., preventive COVID-19 infection behaviors) to cope with their fear. However, the beliefs in COVID-19 information assessed in the present study were not solely based on misinformation (because the present study assessed to what extent an individual believes in COVID-19 information irrespective of whether it is correct or incorrect). Future studies should therefore design specific instruments assessing beliefs in COVID-19 misinformation and beliefs in COVID-19 correct information separately to distinguish the effects of believing in COVID-19 information.

There are some limitations in the present study. First, both the BCIS and PCIBS were newly developed adopting a relatively simple method (e.g., without a thorough literature review to identify all potential items). Therefore, the BCIS and PCIBS may not capture the entire concept of beliefs and preventive behaviors related to COVID-19. However, with the urgent need to assess beliefs and prevent behaviors related to COVID-19, the present authors believe that both BCIS and PCIBS have promising psychometric properties that are suitable instruments at the present time. Nevertheless, future studies using rigorous instrument development methods are needed to strengthen the BCIS and PCIBS. Second, test-retest

reliability, an important psychometric property for instruments, was not examined for the FCV-19S, BCIS, and PCIBS. Therefore, further psychometric testing on the test-retest reliability of the three instruments is needed. Third, the instruments used to construct the hypothesized path model all relied on self-report data. Therefore, single-rater bias and memory recall bias may present in the model tested. Finally, the present study utilized a cross-sectional design so no causal relationships can be determined in the preliminary path model. Future longitudinal studies are warranted to verify the causality between the variables examined here.

Conclusion

The present study demonstrated satisfactory psychometric properties in three new instruments assessing constructs related to COVID-19. More specifically, the FCV-19S, the BCIS, and the PCIBS were found to have a single-factor structure with high internal consistency. Moreover, a path model was constructed and showed a positive association between believing in COVID-19 information and fear of COVID-19, a negative association between fear of COVID-19 and preventive COVID-19 infection behaviors, and a positive association between fear of COVID-19 and psychological distress.

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Table 1. Participants' characteristics (*N* = 400)

	Mean (*SD*)	*n (%)*
Age (year)	46.91 (10.92)	
Gender (Female)		178 (44.5)
Diagnosis		
Schizophrenia		242 (60.5)
Bipolar disorder		67 (16.8)
Major depression disorder		28 (7.0)
Others		63 (15.7)
Educational year	11.31 (2.98)	
Source of COVID-19 information		
LINE chat room		41 (10.3)
LINE news page		99 (24.8)
Facebook		37 (9.3)
Online news		70 (17.5)
Television		347 (86.8)
Traditional newspaper		98 (24.5)
Healthcare providers		141 (35.3)

Table 2. Item and scale properties of the Fear of COVID-19 Scale (FCV-19S), Believing COVID-19 Information Scale (BCIS), and Preventive COVID-19 Infection Behaviors Scale (PCIBS)

	Mean (SD)	Skewness	Kurtosis	Missing (%)	Floor effect (%)	Ceiling effect (%)	Item-total correlation	Factor loading
FCV-19S	2.63 (1.02)	0.04	-0.73	0.0	12.0	1.3	--	--
F1	3.02 (1.33)	-0.14	-1.16	0.0	18.8	14.3	.69	.68
F2	2.84 (1.27)	-0.04	-1.14	0.0	20.5	8.8	.83	.83
F3	2.36 (1.13)	0.47	-0.63	0.0	27.3	4.0	.81	.82
F4	2.75 (1.29)	0.09	-1.19	0.0	22.5	8.5	.83	.83
F5	2.70 (1.22)	0.08	-1.10	0.0	21.8	6.0	.82	.83
F6	2.37 (1.14)	0.44	-0.75	0.0	27.3	3.5	.81	.80
F7	2.42 (1.64)	0.35	-0.89	0.0	27.8	3.8	.85	.84
BCIS	3.31 (0.74)	-0.31	1.36	0.3	1.8	4.3	--	--
B1	3.05 (0.93)	-0.26	0.43	0.0	7.8	5.8	.75	.73
B2	3.25 (0.91)	-0.29	0.55	0.0	5.5	8.3	.83	.83
B3	3.17 (0.86)	-0.06	0.60	0.0	4.0	7.0	.71	.69
B4	3.30 (0.88)	-0.11	0.59	0.3	3.8	9.5	.82	.83
B5	3.66 (0.91)	-0.61	0.48	0.0	2.8	16.0	.82	.81
B6	3.44 (0.86)	-0.24	0.46	0.3	2.8	10.5	.81	.82
PCIBS	3.54 (0.92)	-0.48	0.05	0.3	2.3	10.0	--	--
P1	3.64 (1.10)	-0.81	0.08	0.0	6.5	21.3	.69	.71
P2	3.26 (1.28)	-0.31	-0.92	0.0	13.0	19.5	.66	.67
P3	3.55 (1.24)	-0.68	-0.47	0.3	10.3	24.5	.67	.68
P4	3.51 (1.23)	-0.64	-0.47	0.3	10.3	22.8	.70	.71
P5	3.73 (1.22)	-0.84	-0.13	0.3	8.8	31.8	.64	.65

Table 3. Confirmatory factor analysis fit indices of the Fear of COVID-19 Scale (FCV-19S), Believing COVID-19 Information Scale (BCIS), and Preventive COVID-19 Infection Behaviors Scale (PCIBS)

	FCV-19S	BCIS	PCIBS
χ^2 (*df*)/ *p*-value	31.64 (14)/ .005	15.36 (9)/ .08	3.16 (5)/ .68
Comparative fit index	.994	.994	1.000
Tucker-Lewis index	.992	.989	1.006
RMSEA	.056	.042	.000
90% CI of *RMSEA*	.030, .082	.000, .077	.000, .054
SRMR	.057	.064	.027

CI = confidence interval; *RMSEA = root mean square error of approximation*; *SRMR = standardized root mean square residual*.

Fit indices:
χ^2 (*df*) = 42.69 (12)
p < .001
Comparative fit index = .974
Tucker-Lewis index = .947
Root mean square error of approximation = .080
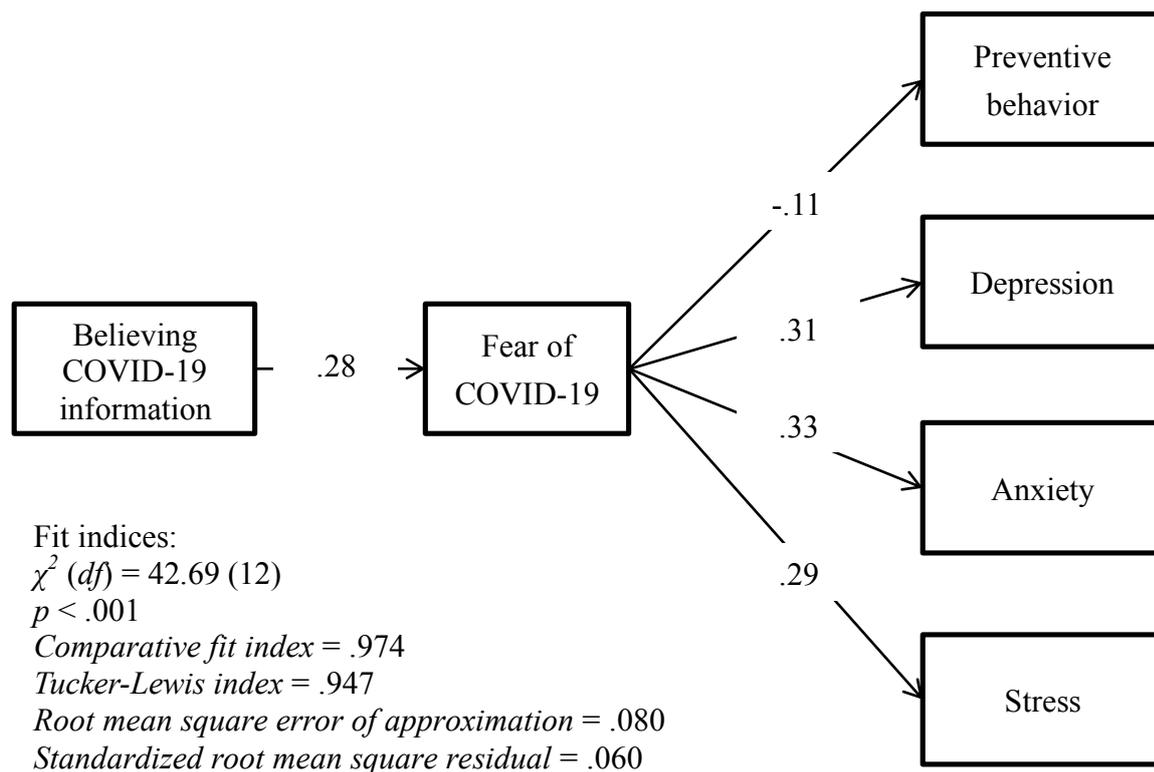*Standardized root mean square residual* = .060

Figure 1. Hypothesized paths in associations between believing COVID-19 information, fear of COVID-19, preventive COVID-19 infection behavior, and psychological distress. *p-values of* all path coefficients were < .001, except for that of fear of COVID-19 to preventive behavior (*p* = .03). Age, gender, and educational year were controlled in the path model.