FEAR OF COVID-19 IN THE CHILEAN POPULATION: PREDICTORS AND FUTURE DIRECTION

MIEDO AL COVID-19 EN LA POBLACIÓN CHILENA: PREDICTORES Y DIRECCIÓN FUTURA

MEDO DA COVID-19 NA POPULAÇÃO CHILENA: PREDITORES E DIREÇÕES FUTURAS

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Palavras-chave: COVID-19, medo, incerteza, saúde mental.

A B S T R A C T

Background: The COVID-19 pandemic has generated an enormous psychological impact, arousing emotions of fear, anxiety, and uncertainty. **Objective:** Our study aimed to investigate the predictors of fear of COVID-19 in the Chilean population, replicating the study by Mertens et al. (2020). **Methods:** An online survey was conducted with 276 participants over 18 years of age residing in Chile. Fear of COVID-19, intolerance to uncertainty, worry, health anxiety, media exposure, general health, risk control, and risk to loved ones were assessed as possible predictors. **Results:** Intolerance of uncertainty (IU) and perceived risk to loved ones were associated with increased fear of COVID-19, while media exposure (other sources) and general health were associated with decreased fear of COVID-19. **Conclusions:** There is an urgent need to promote measures that improve risk communication based on reliable and truthful information to reduce uncertainty and the mental health impact of the pandemic.

R E S U M E N

La pandemia por COVID-19 ha causado un impacto psicológico, despertando emociones de miedo, ansiedad e incertidumbre. Nuestro estudio investigó factores predictores del miedo al COVID-19 en la población chilena, replicando el estudio de Mertens et al. (2020). **Método:** Encuesta online con 276 participantes mayores de 18 años en Chile. Se evaluó miedo al COVID-19, intolerancia a la incertidumbre, preocupación, ansiedad por la salud, exposición a los medios, salud general, control de riesgo y riesgo para los seres queridos como posibles predictores. **Resultados:** Intolerancia a la incertidumbre (IU), exposición a medios (periódicos) y riesgo percibido para los seres queridos se asociaron con miedo al COVID-19 aumentado, mientras que exposición a medios (otras fuentes) y salud general se asociaron a miedo al COVID-19 disminuido. **Conclusiones:** Urge promover medidas que mejoren la comunicación de riesgo, basada en información confiable, para reducir la incertidumbre y el impacto en la salud mental durante la pandemia.

R E S U M O

A pandemia de COVID-19 causou um impacto psicológico, despertando emoções como medo, ansiedade e incerteza. Este estudo investigou fatores preditores do medo da COVID-19 na população chilena, replicando o estudo de Mertens et al. (2020). **Método:** Foi realizada uma pesquisa online com 276 participantes maiores de 18 anos no Chile. Avaliaram-se medo da COVID-19, intolerância à incerteza, preocupação, ansiedade relacionada à saúde, exposição à mídia, saúde geral, controle de risco e risco percebido para os entes queridos como possíveis preditores. **Resultados:** Intolerância à incerteza (IU), exposição à mídia (jornais) e risco percebido para os entes queridos foram associados a níveis mais altos de medo da COVID-19, enquanto exposição à mídia (outras fontes) e saúde geral estiveram associados a níveis mais baixos de medo da COVID-19. **Conclusões:** É urgente promover medidas que melhorem a comunicação de risco, com base em informações confiáveis, para reduzir a incerteza e o impacto na saúde mental durante a pandemia.

In December 2019, the Chinese city of Wuhan became the center of attention due to the emergence of a disease caused by the SARS-COV-2 virus, which would become known as COVID-19. After a couple of months of abrupt expansion, it became a cause of   global concern due to the exponential increase in the number of infected people and deaths (Wang, Horby et al., 2020), acquiring global pandemic status by March 2020 (World Health Organization [WHO], 2020). As of 30th July 2023, there are 768.654.968 cumulative confirmed cases worldwide and 6.953.483 deaths from the infection (WHO, 2023). According to official numbers the Ministry of Health reported in its Epidemiological Reports, Chile currently has 53,299 confirmed deaths (Gobierno de Chile, 2024).

To deal with the COVID-19 pandemic, governments worldwide have imposed restrictive measures, such as social distancing, isolation, quarantine, and preventive measures. In Chile, the health authorities implemented a dynamic quarantine as a health strategy to deal with the COVID-19 pandemic, in which the quarantine is established, lifted, or prolonged according to a weekly evaluation of the epidemiological situation of the municipalities (Kristjanpoller et al., 2021). Quarantine involves unpleasant conditions such as separation from loved ones, restriction of personal freedom, and uncertainty about one's own and others' health status, all of which can have significant psychological effects on affected individuals (Brooks et al., 2020). In the Latin American population, recent studies show various impacts on vulnerable populations such as migrants, women, children, older people, people with disabilities, people experiencing homelessness, and informal workers (Gallegos et al., 2022). In addition, in terms of risk groups, in Chile, problems caused by information overload and the strategies used to manage it have been described, which include avoiding it, verifying its veracity, and using the media selectively (Villena et al., 2023).

Overall, the evidence confirms that the COVID-19 pandemic has generated in a large proportion of individuals an enormous psychological impact, causing anxiety, depression and post-traumatic symptoms (Talevi et al., 2020), but also fear of contagion, insomnia, stress symptoms, as well as other mental health problems related to loss experiences (Coutinho et al., 2023; Odriozola-Gonzalez et al., 2020; Razai et al., 2020; Sher, 2020). Although in these extreme circumstances, such as a pandemic, it may be appropriate to react with fear, anxiety, and stress symptoms, nevertheless, if the symptomatology remains, it may hinder the ability of affected individuals to function in daily life (Razai et al., 2020).

Moreover, it has been reported that, despite early psychological interventions, different populations in different countries continue to report symptoms of depression, anxiety, and stress weeks after these interventions (Wang, Pan et al., 2020; Odriozola-Gonzalez et al., 2020). A year into the pandemic, levels of depression, anxiety, and stress remained alarming, and intolerance of uncertainty (IU), loneliness, and fear of losing one's job were risk factors for mental health (Fiorenzato & Cona, 2022), thus demonstrating the maintenance over time of the psychological impact caused by the pandemic.

The current and ongoing threat posed by the COVID-19 pandemic triggers several emotional consequences, such as fear and anxiety, basic human emotions that are natural reactions to threats (Quezada-Scholz, 2020). Fear can be conceptualized as an adaptive response to the environment in the face of impending environmental threats (Coelho et al., 2020). However, fear becomes maladaptive if it is excessive, as in anxiety disorders, or reduced, as in life-threatening behaviors in the face of a potential threat (Mertens et al., 2020). Fear can result in optimal reactions to cues to avoid potential threats, but it can also lead to a disproportionate and prolonged emotional state of anxiety (Wotjak & Pape, 2013).

During pandemics, fear has been a strongly ingrained emotion in the population, in addition to the resulting stigma and prejudice (Tognotti, 2013), and the current pandemic is no exception. One of the main characteristics of the COVID-19 pandemic is the constant presence of uncertainty. People face a threat that they can neither see nor perceive. Consequently, COVID-19 becomes a threat that people cannot directly control. From the point of view of healthcare workers, in addition to the fear of developing infection, they are also affected by the fear of not providing adequate care to patients and the fear of infecting family and friends because of their work, among others (Cawcutt et al., 2020). In the general population, the COVID-19 pandemic has implications in different areas of life, such as family, educational, occupational, social, work, etc. (Ornell et al., 2020; Fiorenzato & Cona, 2022), so it is capable of triggering many fears, such as fear of contamination, fear of the future, fear of financial instability, among others (Coelho et al., 2020), as well as increased uncertainty due to an almost inevitable economic and social repercussion (Ornell et al., 2020).

Along with fear of COVID-19, avoidance of situations perceived as threatening, depressive feelings, and worry about infection increase (Tsang et al., 2021). Safety behaviors, such as frequent hand washing, physical distancing, and wearing masks in public, protect people from the risk of infection in the context of a pandemic but can also be maladaptive when they are persistent and performed in the absence of a likely threat, resulting in interference with daily life, high levels of distress, and maintenance over time of high levels of fear (Knowles & Olatunji, 2021). Along the same lines, a study conducted with Latin American and Caribbean samples showed that anxiety about COVID-19 significantly predicted preventive behavior and psychological well-being, while the perceived probability of death from COVID-19, the perceived severity of the disease, and concerns about virus transmission were positively related to anxiety (Caycho-Rodríguez et al., 2022). Another study that evaluated the influence of fear of contracting COVID-19 in Latin American samples showed that in Mexico and Chile, it had no impact on psychological well-being or reactive aggression and that adaptive variables protect mental health by mitigating adverse effects during critical and unexpected situations, such as a pandemic (García et al., 2023).

Historically, pandemics affect the mental health of the population and precipitate the onset or increase of psychological symptoms, even affecting the immunity of affected individuals (Moukaddam, 2019). It has also been observed that there are risk factors or vulnerability factors for developing a fear of COVID-19 (Asmundson & Taylor, 2020). Among these, it has been found that people with pre-existing mental illness and women were at higher risk for psychological distress and fear during the pandemic (Rahman et al., 2020). In Chile, women, people with chronic illnesses, families already infected, people who have lost economic activity, and people who perceive that the government has responded poorly to the pandemic are more prone to develop a fear of COVID-19 (Cerda & Garcia, 2021). Coelho et al. (2020), through a literature review, found vulnerability factors such as IU, social isolation, health anxiety, fear of contagion, and fears related to politics and information management. On the other hand, Mertens et al. (2020), through a self-developed coronavirus fear questionnaire, found that IU, health anxiety, risk to loved ones, and seeking additional information about COVID-19 function as independent predictors of coronavirus fear.

In 2022, findings by Gullo et al. (2022) showed that fear of COVID-19 was significantly associated with stress, anxiety, and depression and that elevated fear of COVID-19 and IU   may be related to the use of emotional regulation strategies that contribute to increased psychological distress. For their part, the results of Shahnawaz et al. (2022) suggest that IU   was indirectly associated with symptom severity in COVID-19-infected individuals through illness perception and fear of the virus. In a correlational study, Baerg and Bruchmann (2022) found that greater IU was associated with more health anxiety, fear of COVID-19, and social distancing behaviors, which also moderated the relationship between searching the Internet for information about COVID-19 and fear of the virus. In a study with 2717 Brazilian participants, De Abreu Costa et al. (2022) found that pandemic anxiety decreased over time due to the habituation process, with IU   being the main associated factor while fear of affecting mental health and of others becoming infected were significant aspects of this fear. By administering questionnaires to 356 older adults, Patrick et al. (2022) found that IU   had indirect effects on COVID-19-related worry and anxiety through behavioral manifestations of anxiety.

More recently, Adamis et al. (2023), through the application of a questionnaire to 310 US adults, found that both IU   and trait worry measured in 2016 predicted the severity of COVID-19 anxiety and stress syndrome during the pandemic, suggesting that both functioned as vulnerability factors for the occurrence of these. In another study, Sorid et al. (2023), through questionnaires with a sample of 204 North American adults, found that prospective IU   moderated the relationship between health anxiety and COVID-associated stress.

As general and scientific concerns have continued in this area, these studies are not the only ones on this subject. Driven by the impact of the COVID-19 pandemic, WHO Member States have agreed to create a new international agreement to improve preparedness and response to future pandemics, given the need to ensure equity of access to essential tools to prevent pandemics, such as expertise and health care (WHO, 2024). All the economic, social, and psychological consequences of the pandemic are still ongoing and make it essential to monitor the mental health of the population to mitigate the emotional impact generated (Odriozola-Gonzalez et al., 2020; Wang, Pan et al., 2020; Brooks et al., 2020; Fiorenzato & Cona, 2022). It is crucial to deepen our understanding of the development of fear of COVID-19 so that public health institutions can intervene more efficiently in mental health problems that have increased during the years of intermittent confinement. As Urzúa et al. (2020) described, psychology can provide valuable scientific evidence to explain, prevent, and intervene in the impact of a health crisis, which is crucial to guide more effective public and private policies in the face of health crises. The more we know about why the fear of COVID-19 is generated, the better we can deal with it as a society, even more so as the risk of a new pandemic is increasing globally (Tognotti, 2013).

Given the prevalence of fear during the pandemic, our study sought to investigate possible predictors of fear of COVID-19 in the Chilean population. To do so, we replicated Mertens et al. (2020). Due to sociocultural differences between the Netherlands (the country where most of the participants in this study lived) and Chile, we used questionnaires validated in Spanish and, through judges, assessed the translation of some questions.

The first vulnerability factor is IU, defined as an individual's propensity to experience fear due to the perceived absence of information at any level of consciousness (Carleton, 2016). Another critical vulnerability factor is health anxiety, which refers to the tendency to misinterpret normal or benign physical symptoms and believe that one has or is acquiring a serious illness in the absence of any actual illness (Abramowitz et al., 2007; Salkovskis et al., 2002). A third vulnerability factor is the worry, conceived as a problem-solving mechanism that becomes pathological when associated with elevated levels of anxiety and distress (Padros-Blazquez, 2018). Exposure to the media and social networks it's considered another important vulnerability factor to the extent that it can be a source of misinformation and fake news. People are exposed to explosive media coverage of everything terrible about the pandemic, especially the number of infected and deaths, and all this bad news negatively affects the mental health of the world's population (Pakpour & Griffiths, 2020). Finally, it is crucial to consider the perceived risk to the health of individuals and their loved ones. Fear of the virus may be associated with perceived coping resources, which are mental resources to mitigate a potential threat (Taylor & Stanton, 2007), increasing the ability to cope with the current coronavirus pandemic.

Replicating the study by Mertens et al. (2020), our study will mainly aim to investigate these possible predictors of fear of COVID-19 in the Chilean population. To do so, we first measured fear of COVID-19 in the Chilean population using a scale validated to Spanish (Ahorsu et al., 2020; Escala de Miedo al COVID-19). Subsequently, we assessed each of the possible predictors of fear of COVID-19.

METHODS

Sample.

Respondents for this study were recruited through online postings using different social networks (e.g., WhatsApp, Facebook, Instagram). Participation was voluntary, and all participants were asked for informed consent, approved by the Comité de Ética e Investigación de la Facultad de Ciencias Sociales de la Universidad de Chile (Ethics and Research Committee of the Faculty of Social Sciences of Universidad de Chile). In total, 276 respondents consented to participate and completed the entire survey. Regarding the sample composition, most respondents were women (67.4%), and 30.8% were men. 5 respondents preferred not to state their sex. Regarding educational level, a large part of the sample had undergraduate higher education (46.4%), 28.3% had a postgraduate higher education, and 23.6% had a high school education. Only two respondents reported having only completed primary education, and 3 responded "none of the above". Regarding whether they worked in health services, most of the sample did not work in health services (80.1%), while 19.9% did. Regarding whether COVID-19 had infected them, most of the sample had not been infected by COVID-19 (86.2%), while 12% had been, and 1.8% were unsure. Whether they had received psychological treatment in the last year, most respondents had not received it (67.4%), and 32.6% had received it. Lastly, regarding the region of residence within Chile, respondents were mainly from the Santiago Metropolitan Region (36.2%) and the Biobío Region (34.1%). Other regions with considerable participation were Coquimbo Region (7.2%), Ñuble Region (7.2%), Valparaíso Region (4.7%), O'Higgins Region (3.3%), Araucanía Region (1.8%), Los Lagos Region (1.8%), Arica and Parinacota Region (1.4%) and Maule Region (.7%). The other regions had one or zero respondents.

Measures.

1.   Fear of COVID-19 Scale. Fear of COVID-19 was measured using the Spanish version of Fear of COVID-19 Scale (FCV-19S), which was designed to assess fear of COVID-19 in the general population in Iran (Ahorsu et al., 2020) and then adapted to Spanish in Lima, Peru by Huarcaya-Victoria et al. (2020). Respondents were asked to rate their level of agreement with each of the 7 statements on a 5-point Likert scale (1 = "Strongly disagree", 5 = "Strongly agree"). Internal consistency, as a reliability value, was acceptable in Ahorsu et al. (2020) and Huarcaya-Victoria et al. (2020) (α = .78 and .82, respectively). Also, the concurrent validity was satisfactory, being supported by two tests, the Hospital Anxiety and Depression Scale (depression, r = .425 and anxiety, r = .511) and the Perceived Vulnerability to Disease Scale (perceived infectability, r = 0.483 and germ aversion, r = .459) (Ahorsu et al., 2020).

2.   Intolerance to Uncertainty Scale (IUS-12). IU   was measured using the IUS-12 developed and validated by Carleton et al. (2007), which assesses an individual's propensity to encounter unpleasant uncertain situations. It consists of 12 statements scored on 5-point Likert scales (1="It does not characterize me at all", 5="It totally characterizes me"). IUS-12 has demonstrated excellent psychometric properties, supported by a convergent validity analysis, correlating with the 27-item version and four other related measures (BDI, BAI, PSWQ, GADQ), and high reliability (α = .91) (Carleton et al., 2007). For this study we used the translated version of the IUS-12 by Amanda Flores and collaborators from the University of Malaga and Instituto de Investigación Biomédica de Málaga (IBIMA), Spain.

3.   Penn State Worry Questionnaire (PSWQ-8). A person's tendency to worry will be measured using the Penn State Worry Questionnaire (PSWQ), which is a questionnaire developed and validated by Meyer et al., 1990, whose internal consistency is high (α = .91) and test-retest reliability is satisfactory (r = .92). Specifically, an abbreviated version of 8 items in Spanish was used, rated on 5-point Likert scales (1 = "Not at all", 5 = "Very much"). (Nuevo et al., 2006; Padros-Blazquez, 2018). This 8-item version had adequate reliability y (α = .85) and concurrent validity of the scale was demonstrated (Padros-Blazquez, 2018).

4.   Short Health Anxiety Inventory (SHAI). Health anxiety was measured using the Short Health Anxiety Inventory (SHAI), used to assess the tendency of individuals to worry about their health, developed and validated by Salkovskis, et al., 2002, which showed good reliability (α = .92) and internal consistency (r = .90), and adapted to Spanish by Arnáez et al. (2019). It consists of 18 questions, each with four options. SHAI showed suitable internal consistency for both total score (α = .86) and subscales (Illness likelihood: α = .85; Negative consequences of illness: α = .70), and good construct and concurrent and discriminant validity (Arnáez et al., 2019).

5.   Media exposure. Respondents were asked to answer three questions about their voluntary exposure to information about coronavirus. To replicate the questions and their respective options from Mertens et al. (2020), these were translated into Spanish by the principal investigator and evaluated by five judges. In particular, they were asked to respond to the following question: "Have you sought any additional information about coronavirus waves? (without considering news seen or read by chance)" with a yes or no. In addition, if they have looked for any information, they were asked to indicate which sources of information they have consulted (options: "Newspapers/websites/regular TV news"; "Social networks (Facebook, Twitter, Instagram, ...)"; "Professional websites (health institutions, blogs published by virologists/biologists, ...)"; "Friends/family/acquaintances"; "Online searches (e.g., via Google, Bing, Ecosia, etc.)", "Other (specify)"; multiple responses can be given). Finally, they were asked to rate the extent to which they pay attention to the media source when searching for new information related to coronavirus using a 5-point Likert scale (1 = "Strongly Agree", 5 = "Strongly Disagree").

6.   General health, risk control, and risk to loved ones. Respondents were asked to rate their overall health, perceived control and risk to loved ones. using 5-point Likert scales. In order to replicate the questions and their respective options from Mertens et al. (2020), these were translated into Spanish by the principal investigator and evaluated by five judges. In particular, they were asked to respond to the following question: "In general, would you rate my overall health as:" (options: "Extremely good," "Somewhat good," "Neither good nor bad," "Somewhat bad," "Extremely bad"). Likewise, perceived control will be assessed with the following question: "In general, I think I can control or avoid becoming infected with coronavirus (due to, for example, limiting social contact, washing hands, wearing a mask, etc.):" (options: "Strongly agree", "Somewhat agree", "Neither agree nor disagree", "Somewhat disagree", "Strongly disagree"). Finally, the perception of risk to loved ones was assessed with the following question: "In general, I believe that people who are important to me (e.g., my grandparents) are at risk of becoming infected and seriously ill due to coronavirus waves" (options: "Strongly agree", "Somewhat agree", "Neither agree nor disagree", "Somewhat disagree", "Strongly disagree").

7.   Demographic information. In order to collect relevant information for the differentiation of the sample, respondents will be asked to indicate the sex with which they identify themselves ("Male", "Female", "Other (specify)", "Prefer not to say"), their age (in exact value), their highest educational level obtained (from "Completed basic education" to "Postgraduate"), whether they work in health services ("yes", "no", "not sure (please clarify)"), whether they have been infected by COVID-19 ("yes", "no", "not sure"), whether they have received psychological treatment in the last year ("yes", "no", "not sure") and their region of residence within Chile.

Survey administration.
All questionnaires described above were delivered through an online survey using the SurveyMonkey platform. The online survey could be completed using a personal computer/laptop, tablet, or smartphone. The complete survey consisted of 58 self-report items and took approximately 12 minutes.

Data analysis strategy.
First, predictors of coronavirus fear, as measured by the FCV-19S, were assessed by Kendall tau b correlation coefficients in the case of continuous predictors (age, IU   , worry, health anxiety, general health, risk control, and risk to loved ones), and Kruskal-Wallis Test for categorical predictors (dummy variables were created for each media; newspapers, social networks, professional pages, friends, online searches, others; sex, educational level, whether they work in health services, whether they

have been infected by COVID-19, whether they have received psychological treatment in the last year, area of residence in Chile) as our data did not met normality assumption. In the case of the region of residence, the variable was grouped into three geographical zones: Northern Zone (from Arica to Coquimbo), Central Zone (from Valparaíso to Ñuble), and Southern Zone (from Biobío to Magallanes). Then, we proceeded to the multivariate analysis, performing a simultaneous linear regression to evaluate the contribution of each of the predictors in explaining the variance of the independent variable, fear of coronavirus, previously measured by FCV-19S. We included all the significant predictors of the bivariate analyses, except by sex, because the dummy variables related to it had too high multicollinearity (VIF over 10) in the first model we tested, which suggests they were trying to account for variability already explained by other variables, thus being redundant. The analyses were performed in the IBM SPSS v26 program, and effect size measures for Kruskal-Wallis were computed using Psychometrica (Lenhard & Lenhard, 2016).

RESULTS

Bivariate analysis.

Correlation coefficients between fear of COVID-19 and the continuous predictors are presented in Table 1. As depicted, IU , worry, health anxiety, general health, and perceived risk to loved ones were all significant ($p < .01$), except for perceived risk control and age.

Table 1.
Correlations.

	Mean (SD)	1	2	3	4	5	6	7
1. Fear of Covid 19	16.83 (5.58)	-	-	-	-	-	-	-
2. Intolerance of Uncertainty	31.81 (8.56)	.30**	-	-	-	-	-	-
3. Worry	24.33 (7.52)	.26**	.48**	-	-	-	-	-
4. Health Anxiety	14.49 (7.78)	.27**	.36**	.40**	-	-	-	-
5. General Health	3.77 (0.99)	-.22**	-.15**	-.23**	-.37**	-	-	-
6. Risk Control	4.56 (0.74)	-.08	-.06	-.05	-.11	.09	-	-
7. Risk for loved ones	4.24 (1)	.14**	.11*	.05	.00	.02	.13*	-
8. Age	37.23 (14.91)	.02	-.19**	-.25**	-.22**	-.00	.08*	-.07

Note. * = p <.05; ** = p <.01.

The results of the Kruskal-Wallis Test investigating the categorical predictors of the FCV-19S are summarized in Table 2. As can be seen, looking up additional information through different information sources (newspapers, social media, friends, online searches) was significantly associated with increased fear of the coronavirus. In contrast "other information sources" were significantly associated with decreased fear of coronavirus. The only sources of information not associated with the fear of COVID-19 were professional sites. The other categorical predictors (sex, educational level, whether they worked in health services, whether they had been infected by COVID-19, whether they had received psychological treatment in the last year, and country zone) were not associated with fear of COVID-19.

Table 2

Kruskal-Wallis Test: COVID-19 Fear.

Predictors	Mean (SD)	H	P-value	Eta^2
Newspapers		13.04	<.01	.04
Yes (n=121)	18.17 (5.27)			
No (n=155)	15.79 (5.60)			
Social media		5.16	<.05	.02
Yes (n= 73)	18.14 (5.59)			
No (n= 203)	16.36 (5.51)			
Professional sites		0.54	.461	.00
Yes (n= 162)	17.01 (5.41)			
No (n= 114)	16.57 (5.81)			
Friends		6.92	<.01	.02
Yes (n=57)	18.54 (5.50)			
No (n=219)	16.38 (5.52)			
Online searches		7.01	<.01	.02
Yes (n=107)	17.98 (5.67)			
No (n=169)	16.10 (5.41)			
Other sources		5.84	<.05	.02
Yes (n=10)	12.70(4.79)			
No (n=266)	16.99(5.55)			
Sex		9.49	<.01	.03
Man (n=85)	15.29 (5.67)			
Woman (n=186)	17.56 (5.44)			
Prefer not to say (n=5)	15.6 (4.22)			
Educational Level		4.04	.401	.00
Complete basic education (n=2)	17 (1.41)			
High school (n=65)	18.03(5.50)			
Undergraduate education (n=128)	16.56 (5.39)			
Postgraduate education (n=78)	16.29 (5.89)			
None of the above (n=3)	16 (7.81)			
Work in health services		4.29	<.05	.01
Yes (n=55)	15.38 (5.30)			
No (n=221)	17.19(5.60)			
COVID-19 infection		2.76	.252	.00
Yes (n=33)	15.79 (5.71)			
No (n=238)	17.04 (5.55)			
Not sure (n=5)	13.80 (5.63)			
Psychological treatment		0.30	.586	.00
Yes (n=90)				
No (n=186)	17.22 (5.61)			
	16.64 (5.56)			
Country zone		1.52	.468	.00
Northern (n=26)	18.04(5.93)			
Central (n=144)	16.48 (5.77)			
Southern (n=106)	17.01 (5.22)			

*Note. *= p <.05; **= p <.01.*

Simultaneous regression analysis.

To look into which predictors uniquely explained the variance in the FCV-19S, we calculate a simultaneous regression model with the Enter method to predict the effect of all significant continuous predictors (IU   , worry, health anxiety, general health, and danger to loved ones) and dummy categorical predictors for media sources that were significantly associated with fear of COVID-19 (newspapers, social media, friends, online searches, and other information sources) on fear of COVID-19. For this purpose, all these significant dependent variables were entered into the model. The R^2 value was .302 and the adjusted R^2 value was .273, which indicates that this model explained 27.3% of the variance in the FCV-19S, and the regression equation was statistically significant. ($F_{(11,264)} = 10.394$, $p<.001$). As a result of the regression, the predictors of IU   , perceived risk to loved ones, general health, and looking up information through other information sources (scientific literature) significantly predict fear of COVID-19. Table 3 presents the standardized and non-standardized regression coefficients of the predictors in the simultaneous regression model.

Table 3

Regression model.

	Non-standardized coefficients		Standardized coefficients			95.0% confidence interval for B	
	B	Error Dev.	Beta	t	P-value	Lower limit	Upper limit
(Constant)	8.01	2.19		3.66	<.01	3.70	12.31
Intolerance of uncertainty	.18	.05	.27	3.77	<.01	.09	.27
Worry	.05	.06	.07	.98	.330	-.05	.16
Health anxiety	.09	.05	.12	1.64	.101	-.02	.19
Newspapers	1.25	.66	.11	1.91	.057	.04	2.54
Social media	-.46	.79	-.04	-.58	.560	-2.02	1.10
Friends	1.26	.79	.09	1.59	.113	-.30	2.82
Online searches	-.40	.73	-.04	-.54	.587	-1.84	1.04
Other sources	-3.41	1.58	-.11	-2.16	<.05	-6.51	-.30
General health	-.71	.34	-.13	-2.11	<.05	-1.38	-.05
Risk for loved ones	.73	.29	.13	2.50	<.01	.16	1.31

*Note. *= p <.05; **= p <.01*

Regression assumptions and outliers.

As Wilkinson and Task Force for Statistical Inference (1999) suggest, we examined graphically our residuals. They are normally distributed as indicated by the P-P plot. Homoscedasticity and linearity assumptions are also met, as suggested by the lack of linear direction in the scatterplot of regression-standardized residual vs. regression-standardized predicted value.

Our residuals are also independent as Durbin-Watson value (2.140) ranks between 1 and 3. With respect to multicollinearity, although the average mean (1.467) of VIF exceeds the proposed cut-off of 1 (Bowerman & O'Connell, 1990), none of the individual predictors surpasses the cut-off of 10 (Myers, 1990) or has a tolerance statistic below 0.2 (Menard, 1995), suggesting that multicollinearity is not a severe threat to the model.

We also searched for problems related to atypical cases. Using standardized residual values over +-2 as a reference, we found just nine outliers below the 5% we decided as maximum tolerable. None have a Cook's distance greater than one; therefore, they do not significantly influence the regression analysis (Stevens, 2002). Taken together, this implies that outliers are not a problem.

DISCUSSION

Although COVID-19 no longer meets the threshold to be classified as a pandemic, it remains prevalent in Latin America and the Caribbean, as surveillance data suggest that this virus has become endemic in the region (Post et al., 2023). In addition, its high initial incidence made it a global emergency since its inception. In this context, it became relevant to study its psychological impact. The main objective of the present study was to investigate possible predictors of fear of COVID-19 by replicating the study of Mertens et al. (2020). Based on a review of the literature, we hypothesized that some individual factors (IU , worry, and health anxiety) would predict increased levels of this fear, as would media exposure (i.e., seeking additional information through different sources) and other health factors (i.e., general health, risk to loved ones, and risk control).

Our results report that IU was associated with greater fear of COVID-19, as was perceived risk to loved ones. Two other significant predictors were seeking additional information through other sources and general health, but these were associated with decreased fear of coronavirus.

Our findings have differences and similarities with those reported by Mertens et al. (2020). Both studies found IU to be a predictor of fear of COVID-19, which is congruent with other studies linking higher IU with higher levels of fear (Carleton, 2016), and with recent research on IU as a contributing factor to the development of this type of fear (Adamis et al., 2023; Baerg & Bruchmann, 2022; Coelho et al., 2020; De Abreu Costa et al., 2022; Patrick et al., 2022; Sorid et al., 2023). In addition, both studies find that risk to loved ones is a robust predictor of coronavirus fear, which is consistent with several studies on concern about infecting family members experienced by healthcare workers (Pfefferbaum & North, 2020; Shreffler et al., 2020), and with other studies assessing this factor as a contributor to COVID-19 fear (Cerda & Garcia, 2021; De Abreu Costa et al., 2022). Despite these congruencies, our study differs in the predictive ability of health anxiety as no relationship was found between this factor and fear of coronavirus. Furthermore, our study found a significant association with fear of COVID-19 with only one media exposure variable ("other sources"). In contrast, Mertens et al. (2020) found significant relationships with increased fear of coronavirus with almost all media exposure variables except "other." In our study, "other sources" was associated with decreased fear of COVID-19. Interestingly, when analyzing qualitative responses, most respondents referred to scientific publications as these other sources. A final difference between the two studies is that ours found an association between general health perception and decreased fear of COVID-19. Apparently, the healthier a person considers him or herself to be, the less fear he or she has of coronavirus.

Interestingly, in both studies, perceived risk to loved ones strongly predicted increased fear of coronavirus. Thus, deepening the knowledge that one of people's main concerns about the pandemic is related to affecting the health of people they care about (Mertens et al., 2020). These findings are consistent with the idea that one of the sources of concern in the population is the existence of chronic diseases and infectivity within the family (Cerda & Garcia, 2021), linking certain groups of people with possible more severe consequences of COVID-19 infection, i.e., the existence of risk groups (Rahman et al., 2020).

Regarding the media, although in our study, no variable has a significant association with increased fear of coronavirus, it is vital to highlight advances in research on the danger of overexposure to pandemic-related information. Frecuent exposure to news about COVID-19 deaths can generate anxiety and decrease well-being in individuals (Gao et al. 2020; Silva et al., 2021), and frequency of internet searches for COVID correlates with fear of the virus and health anxiety (Baerg & Bruchmann, 2022). On the other hand, multiple sources of information characterized by dramatization of reality or even the invention of absolute truths, "fake news," can be found on the Internet, addressing the urgency of the fight against the establishment of COVID-19 disinformation campaigns (Su et al., 2021). Given that "other sources" were associated with a decreased fear of coronavirus and participants indicated that they were referring to scientific publications, it is fair to say that becoming informed from scientific sources may reduce fear of coronavirus.

Despite the empirical advances in understanding the fear of COVID-19, the full extent of the phenomenon still needs to be determined. Although the set of predictor variables evaluated in various investigations has explained an essential part of the phenomenon, there is still room to expand or eliminate predictors from the proposed explanatory models. The greater the knowledge of the development of this fear, the better measures such as quarantine can be adjusted to reduce its psychological impact (Brooks et al., 2020). In clinical psychology, a better understanding of the fear of COVID-19 and its predictors could contribute to the formulation of more specialized therapeutic support for people affected by this fear. Consequently, the psychological effects of the pandemic and the clinical and social implications of fear of COVID-19 are open fields for further research.

One obvious fact is that fear of COVID-19 has changed over time. In the study by Mertens et al. (2020), many predictors were established, and seeking additional information about the coronavirus strongly predicted fear of COVID-19. In our research, this variable no longer predicts this fear. Just as the content of fear changes over time (Hidaka et al., 2021), so do the factors that explain it. If the predictors changed over more than a year between the study by Mertens et al. (2020) and data collection in our study (2021), fewer and fewer factors are associated with fear of COVID-19.

Considering that the risk of development of a new pandemic is increasing (Tognotti, 2013), in the context of the globalized world in which we live and the expansion of human activities and their environmental effects (Piret & Boivin, 2021), it opens the question of whether fear of a viral agent or pathogen will reappear, and most likely it will, as this has happened during previous pandemics in human history (Moukaddam, 2019). All of these issues are open questions for new research that is interested in this phenomenon's future direction, which aligns with the WHO's international agreement to improve preparedness and response to future pandemics (WHO, 2024).

Based on the literature reviewed, one could inquire into the fear reaction to the emergence of pandemic infectious agents as a cross-cutting phenomenon, a fear of which there is a record from the earliest pandemics such as plague or cholera (Tognotti, 2013; Moukaddam, 2019).

Some recommendations coming from this study may be the continuous evaluation of the communication of governments and health institutions to promote truthful sources of information and contain the spread of fake news and, thereby, reduce the uncertainty generated by the lack of knowledge or partial knowledge of the threat posed by the coronavirus, the continuous research on the changes that occur in fear of COVID-19 in the population, the adjustment of public and private policies that should consider the different consequences of the pandemic on people's mental health. The future challenge is how to live with the virus and anticipate our reaction to new pandemics.

In Chile, the pandemic has revealed long-standing social problems: inequity and state neglect in protecting fundamental rights such as timely access to health services for the population (Sánchez Delgado, 2022). In addition, this health crisis has produced long-lasting adverse effects on mental health care, underscoring the need to strengthen these services in future crises (Toro-Devia et al., 2023). Thus, lessons learned can be used to develop best practice recommendations for current and future pandemics and health crises.

The findings of the present study could be used to improve the assessment and intervention of fear in other diseases with similar characteristics by designing psychological interventions focused on IU   and health-related anxiety, implementing educational programs that emphasize the importance of physical and mental well-being, and how these can influence the perception of fear in the face of a health crisis. These actions would not only help to mitigate the fear of COVID-19, but would also be applicable to manage the psychological response in future pandemics or similar health crises.

Considering that fear is a core process in anxiety disorders, the present study contributes to the understanding of vulnerability factors for post-pandemic anxiety-related disorders and, therefore, can be considered in the clinic.

Some limitations of our study include using a convenience sampling system, in which an open call was made to participate in the survey voluntarily. In addition, since it was a call for participation through social networks, people who did not have access to technological devices or who did not have accounts in these social networks could not participate in the study, which limits the generalizability of the results. Another limitation is the high number of participants with an educational level equivalent to higher education, either undergraduate or graduate (74.7% in total), which differs from the national reality (24% have complete higher education and 13.1% incomplete) (Ministerio de Desarrollo Social y Familia, 2020). A final limitation is the use of tests that have not been validated for the Chilean population but have been validated in Spanish-speaking countries. However, the existence of universal scales agreed upon in each language is currently being promoted (Lira & Caballero, 2020). On the other hand, the existence of multiple versions of the same scale, from the same country or from countries that share a language or cultural context, constitutes a serious problem in research because many times these versions are not comparable and differ significantly from each other in terms of reliability and validity (Guillermin, 1995, as cited in Lira & Caballero, 2020).

CONCLUSIONS

Among the predictors investigated, four factors predicted fear of COVID-19 in the Chilean population. IU   and perceived risk to loved ones were significantly associated with increased fear of COVID-19, while information seeking through other sources (scientific publications, mainly) and general health perception were significantly associated with decreased fear of COVID-19. These results call for measures to improve risk communication and governmental actions, to promote truthful and reliable information, and to reduce uncertainty and mental health problems, such as anxiety and depression, generated by the pandemic.

Data Availability
The entire data set supporting the results of this study is available upon request from the contact author Vanetza E. Quezada-Scholz. The data set is not publicly available due to containing information that compromises the privacy of research participants. The data set is not publicly available because it contains information that compromises the privacy of research participants.

Availability of analytical methods
The entire set of analytical methods supporting the results of this study was published in the paper itself.

Materials availability
The entire body of material supporting the results of this study was published in the article itself.

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