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Coronavirus awareness, confinement stress, and mental health: Evidence from Honduras, Chile, Costa Rica, Mexico and Spain

Miguel Landa-Blanco [a,*], Claudio J. Mejía [a], Ana Lucía Landa-Blanco [a], Carlos A. Martínez-Martínez [a], Daniela Vásquez [b], Gabriela Vásquez [a], Paulo Moraga-Vargas [c], Yaraní Echenique [a], Glenda M. Del Cid [d], Brayan D. Montoya [e]

[a] National Autonomous University of Honduras, Honduras
[b] University of Navarra, Spain
[c] Neurolectura LTDA, Chile
[d] Autonomous University of Coahuila, Mexico
[e] National University of Costa Rica, Costa Rica

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ABSTRACT

Rationale: The purpose of the current study was to analyze the influence of coronavirus awareness, psychological stress responses, and sociodemographic variables on mental health indicators (somatization, depression, and anxiety) in residents of Honduras, Chile, Costa Rica, Mexico, and Spain.

Methods: The study used a quantitative, cross-sectional approach. Data was collected online using the Brief Symptom Inventory-18 (BSI-18); the Coronavirus Awareness Scale-6 (CAS-6) and a questionnaire that included psychological and sociodemographic questions. The total sample size consisted of 1559 respondents from Honduras (34%), Chile (29%), Costa Rica (17%), Mexico (11%), and Spain (9%).

Results: The most common stress domains correspond to family (22.97%), financial (22.53%), academic (16.47%), leisure time constraints (14.23%), health (12.48%), peer group (7.63%), and religious concerns (3.69%). These domains are significantly associated with the respondent's country, sex, employment status, and being or not a health worker. Respondents who reported confinement stress also reported higher scores in anxiety, depression, and somatization. The Global Severity Index was significantly predicted by confinement stress, health, academic, and leisure time-related stress, sex, age, being a health worker, COVID-19 Personal Concern, and Perceived Seriousness. Non-significant predictors were employment status, the number of people at home, presence of older adults and children at home, financial, peer group, family, and religious concerns; the regression model had an R^2 of 0.26. Similar analyses were conducted for somatization, depression, and anxiety subscales.

Conclusions: The COVID-19 pandemic has adverse effects on the mental health of the general population, particularly regarding anxiety, depression, and somatization. Specific populations, such as women and health-care workers, are at particular risk of suffering a deterioration in mental wellbeing. The implications of the study for public policy are discussed.

1. Introduction

1.1. Background

Coronaviruses have been a known cause of respiratory infections in humans for over 50 years. They are known for being one of the most usual causes of the common cold, though not every type of Coronavirus causes a mild respiratory infection. There are currently seven types of Coronavirus identified as human pathogens and two of them are responsible for severe and potentially fatal respiratory tract infections (Andersen et al., 2020); these are the Middle East Respiratory Syndrome (MERS)-CoV and the Severe Acute Respiratory Syndrome (SARS)-CoV (Guo et al., 2020).

In December 2019, China was suffering from an outbreak of an

* Corresponding author.National Autonomous University of Honduras, Tegucigalpa, Department of Clinical Psychology, Honduras.
E-mail address: miguel.landa@unah.edu.hn (M. Landa-Blanco).

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atypical pneumonia from an unknown cause (Shereen et al., 2020). By January 2020, the pathogen was isolated and initially designated as 2019-nCov and later referred to as SARS-CoV-2 by the International Committee on Taxonomy of Viruses (Hufert and Spiegel, 2020). In February 2020, the disease was named COVID-19 by the World Health Organization (WHO) (Rothan and Byrareddy, 2020).

One of the most important factors of this disease is its capacity to spread; initially, it was reported that the most common method of human-human transmission was through the respiratory tract, by droplets, respiratory secretions, and direct contact. However, recent studies have reported the possibility of fecal and blood routes of transmission, an alarming situation for the current pandemic (Guo et al., 2020; Bulut and Kato, 2020). By April 17th, 2020, the WHO had reported 2,074,529 confirmed cases and 139,378 deaths globally (World Health Organization, 2020a). By February 7, 2021, there were 105, 429, 382 cumulative cases and 2,302,614 cumulative deaths reported worldwide (World Health Organization, 2021). The description of confirmed COVID-19 death and cases for the countries included in the study are shown in Table 1.

1.2. The psychological impact of the pandemic

Epidemics are high-impact health emergencies, in which the lives of many people are threatened, and can cause elevated rates of morbidity and a significant death toll; the fear of contagion aggravates the situation (Pan American Health Organization, 2016). Studies of some pandemics have demonstrated the psychological effects that these can cause.

For example, the Ebola outbreak caused fear and anxiety (of infection, death, separation from or loss of loved ones); shame, guilt, frustration, anger, helplessness, stigma, isolation and grief or loss; long-term trauma from the course of infection, witnessing death of others; and mental health problems (Van et al., 2016).

During the H1N1 outbreak, people showed concern, emotional distress, panic, depression, or emotional disturbance (Shigemura et al., 2009). In the case of the Hong Kong SARS epidemic, the levels of panic and concern increased in the population and remained after the outbreak, and people avoided social activities and traveling to other countries during the height of the epidemic (Lau et al., 2003). It also had important economic repercussions (Siu and Chim, 2004; Quah and Hin-Peng, 2004).

1.3. Psychological consequences of social isolation measures

Quarantine and social isolation are terms that are used interchangeably to refer to the measure of restriction of the movement of people, to prevent their exposure to those who have or could have a contagious disease (Centers for Disease Control and Prevention, 2017). Before the COVID-19 crisis, this measure was used against the outbreak of the SARS in China (Hsieh et al., 2007), and Canada (Schabas, 2004) as well as during the Ebola outbreak of 2014 in Africa (Campbell et al., 2017). Such cases have allowed the study of the psychological consequences that a massive quarantine can cause.

Regarding the COVID-19 crisis, a rapid review of the evidence on the psychological impact of quarantine was performed, considering studies from ten countries, and including people with SARS, Ebola, H1N1 influenza, MERS, and equine influenza. Most of the studies reported negative psychological effects, including symptoms of post-traumatic stress, depression, anxiety, stress, irritability, insomnia, anger, emotional exhaustion, and confusion. Stressors included increased quarantine duration, fear of infection, frustration, boredom, inadequate information and supplies, financial losses, and stigma (Brooks et al., 2020).

1.4. Mental health indicators: stress, somatization, anxiety, and depression

The current study will focus on mental health indicators such as stress, anxiety, depression, and somatization. Stress can be defined as the biological response to intrinsic and extrinsic stimulus which can trigger different pathological conditions, affecting the overall health (Yaribeygi et al., 2017). Studies have shown that psychological and psychochemical stress can affect the immune system, making people more prompt to have different diseases or even fatal conditions (Bae et al., 2019).

One common measure used to assess the presence of psychological conditions is the Brief Symptom Inventory (BSI-18), an 18-item version of the Symptom-Checklist 90-R. It evaluates the presence of somatization, depression, and anxiety symptoms. The sum of these factors corresponds to the Global Severity Index (Franke et al., 2017). In this framework, anxiety is the anticipation of future threats. It is associated with muscle tension, vigilance to future danger, and avoidant behaviors that are usually excessive or persisting (American Psychiatric Association, 2013). Health anxiety related to viral outbreaks can be characterized by catastrophic misinterpretations of benign sensations in the body, dysfunctional beliefs about health and disease, and maladaptive coping behaviors (Asmundson and Taylor, 2020).

Contrastingly, depression is characterized by the presence of sadness, emptiness, or irritable mood, with somatic and cognitive changes (American Psychiatric Association, 2013). It affects how people feel, think, and act. It can lead to other emotional and physical problems that may decrease people's ability to function adequately (American Psychiatric Association, 2017). Somatization is the presence of physical symptoms without a medical explanation; it involves abnormal thoughts, feelings, and behaviors (American Psychiatric Association, 2013). Studies have shown that somatization is one of the emotional reactions to COVID-19 (Roy and Sinha, 2020).

1.5. COVID-19 containment measures: an overview

The current health crisis derived from the COVID-19 situation has alerted most of the countries around the world, causing them to take prevention and containment measures that help reduce the spread of this disease among the population. The responses vary per country, but

Table 1
Description prevalence of confirmed COVID-19 deaths and cases for the countries included in the study.

Country	April 17, 2020		February 7, 2021		Population (in millions)
	Cumulative cases	Cumulative deaths	Cumulative cases	Cumulative deaths	
Honduras	426	35	153, 253	3694	9.9
Chile	8807	105	748, 082	18, 895	19.1
Costa Rica	626	27	196, 438	2, 672	5.1
Mexico	5847	449	1,912,871	164,290	128.9
Spain	182,816	19,130	2,913,425	60,802	46.8

Note. Data regarding cumulative cases and deaths was obtained from the Coronavirus disease 2019 (COVID-19): Situation Report-88 (World Health Organization, 2020a) and the COVID-19 Weekly Epidemiological Update – February 7, 2021 (World Health Organization, 2021), containing data until April the 17th and February 7, 2021, respectively. Countries' population data was obtained from the Explore the Data Dashboard from the World Health Organization (2020b).

to a greater or lesser extent, the member countries have adopted the indications given by the WHO.

Some of the basic recommendations given by the WHO include frequent handwashing with soap and water, covering coughs or sneezes with a flexed elbow or handkerchief, and keeping at least a meter of distance between subjects (World Health Organization, 2020c). Other measures have been more restrictive, such as social distancing, limiting the number of people allowed to gather, and restriction of the free movement of people (quarantine). The WHO stresses that restrictions on free movement, as well as events of any kind that gather large numbers of people, must be regulated, preventing the spread of the virus from increasing (World Health Organization, 2020d).

1.6. Socioeconomic repercussions of the COVID-19 pandemic

In addition to the repercussions of COVID-19 in the health sector, there are also complex impacts in other segments of the socioeconomic structure. Governments have implemented different measures to control the spread of the virus, but some of these restrictions have paralyzed society's social and economic flow. Higher unemployment levels, lower incomes, and increases in poverty rates are part of the short-term consequences of such restrictions. In the mid-long-term, countries could experience periods of bankruptcy and economic contractions (Economic Commission for Latin America and the Caribbean, 2020).

1.7. An overview of the COVID-19 situations in the countries included in the study

1.7.1. Honduras

On March 10th, 2020, Honduras announced its first two cases of COVID-19. Shortly after, the government implemented mandatory restrictions such as partial curfews that limited people's circulation based on their identification number. The only available businesses were supermarkets, pharmacies, banks, and gas stations (Government of the Republic of Honduras, 2020).

Among the initiatives that were taken in Honduras to provide psychological assistance to the general population during the pandemic, the Honduras College of Psychologists (COPSIH) organized work teams to offer free counseling to people who requested it. (Honduras College of Psychologists, 2020). The COPSIH has also promoted access to online courses related to psychological care in times of crisis and pandemic.

1.7.2. Chile

On March 3rd, 2020, Chile reported the first COVID-19 case, by March 15th the suspension of school was mandatory for all public, state-subsidized, and private schools in both primary, secondary, and tertiary levels (Ministry of Health of Chile, 2020a). Other measures included the installation of sanitary customs posts in areas with few cases or a low prevalence (checkpoints to control body temperature and other general health conditions to issue sanitary passports). There was a daily nation-wide curfew from 10:00 p.m. to 05:00 a.m., and quarantine containment around areas with a high incidence of infections (Ministry of Health of Chile, 2020b).

As of March 22nd, the Chilean government had specific sectors quarantined. To implement the quarantine in a place, three criteria had to be met: variation in incidence, location of infections, and a sanitary factor (elderly population, social vulnerability index, patients with chronic illnesses, and access to health services) (Ministry of Health of Chile, 2020c).

The Chilean government released an official communication plan called "Coronavirus COVID-19 Action Plan", a website where it is possible to find data regarding official figures (total cases, number of deaths, etc.), quarantine guidelines, action plans, self-care plans, protocols, practical guidelines, and FAQs (Government of Chile, 2020). "The Practical Guide to Emotional Well-being: Quarantine During COVID-19″ is a guide that offers advice about emotional well-being for children, teenagers, and the elderly (Ministry of Health of Chile, 2020d). It also provides information on how to access expert emotional support and advice from mental health helplines in different governmental and non-governmental offices.

1.7.3. Costa Rica

The Ministry of Health reported the first COVID-19 confirmed case on March 6th, 2020 (National University of Costa Rica, 2020). Temporary administrative measures were implemented to suspend health authorizations granted for mass gatherings, which were mandatory throughout the country as part of the preventive and mitigation actions ordered by the Ministry of Health to respond to the COVID-19 yellow alert. These measures were also applied at public meeting sites with approved health permits. There were technical and general guidelines for public, institutional and health services for the general population published on the website of the Ministry of Health (Ministry of Health of Costa Rica, 2020).

On March 28th, 2020, the Costa Rican Social Security Fund (CCSS) offered psychological care to health staff attending the national emergency through the COVID-19 crisis (Costa Rican Social Security Fund, 2020). The Costa Rican Association of Psychology Professionals also made telepsychology available to Costa Ricans as a means of providing comprehensive health care (Costa Rican Association of Psychology Professionals, 2020).

1.7.4. Mexico

According to The Ministry of Health of Mexico, on February 27th, 2020, the first case of COVID-19 was reported (Secretary of Health of Mexico, 2020a), and by March 20th, 2020, the first two deaths from COVID-19 were confirmed (Government of Mexico, Secretary of Health, & Undersecretary of Prevention and Promotion of Health, 2020). The Mexican government, in collaboration with the Ministry of Health, implemented prevention and control programs for different infection scenarios (Government of Mexico, 2020a). In addition to basic hygiene measures, the National Day of Healthy Distance began on March 23rd, to reduce the number of infections by suspending classes, non-essential activities, and canceling mass events. The program also called for avoiding crowds, keeping families at home, maintaining a physical distance of at least 1.5 m between persons, and protecting the elderly and people suffering from certain diseases (Secretary of Health of Mexico, 2020b).

Programs of psychological assistance were also developed. The Ministry of Health, the School of Psychology and the National Institute of Psychiatry implemented an online questionnaire to detect mental health risks. The National Autonomous University of Mexico offered remote psychological care, audio-visual support for mental health, and telephone psychological assistance through the National Commission against Addictions, among others (Government of Mexico, 2020b; National Autonomous University of Mexico, 2020).

1.7.5. Spain

The first case of COVID-19 in Spain was confirmed on January 31st, 2020 by the Microbiology National Center of the Carlos III Health Institute, using information from the Ministry of Health, Consumption and Social Welfare (2020a). With the rapid spread of the virus, reinforced containment measures began in high transmission areas. These included the cancellation of face-to-face educational activities and specific recommendations for the workplace were given (Ministry of Health, Consumption and Social Welfare, 2020b).

As of April 17th, 2020, only the United States surpassed Spain in confirmed cases; and in terms of the number of deaths, Spain was in third place, behind the United States and Italy (Johns Hopkins University and Medicine, 2020). To contain the spread of the disease, the Government decreed a state of alarm on March 14th, on the entire Spanish territory. Given this decision, people could only circulate through public use routes to carry out basic activities such as purchasing

food and pharmaceutical products; assistance to health centers; commuting to the workplace; assistance and care for vulnerable people; displacement to financial and insurance entities, or other significant needs (Ministry of the Presidency, Relations with the Courts and Democratic Memory, 2020). Officially, the Ministry of Health and the General Council of Official Colleges of Psychologists of Spain launched a telephone psychological care service for people with difficulties derived from COVID-19 (Ministry of Health, Consumption and Social Welfare, 2020c).

1.8. Purpose of the study

The COVID-19 pandemic has a wide series of social, economic, and psychological effects that could influence the current and future mental health of the population. In such extraordinary circumstances, it is expected to find an increase in psychological symptoms as a response to situational stress. This stress, in turn, raises the incidence of symptoms related to depression, anxiety, and harmful behavior. Hence, it is crucial to increase the scientific knowledge on the psychological responses to such critical situations (Holmes et al., 2020). Given the novelty of this pandemic, there is a dearth of research concerning the implications of the COVID-19 in the general population regarding awareness, the psychological stress responses (to the disease and the measures implemented to contain it), and overall mental health of the individuals.

Considering this prior research, the purpose of the current study was to analyze the influence of coronavirus awareness, psychological stress responses, and sociodemographic variables on mental health indicators in people who reside in Honduras, Chile, Mexico, Costa Rica, and Spain. Specifically, these mental health indicators included: somatization, depression, anxiety, and confinement stress. As data was collected from March 29th until April 17th, 2020, the present study should provide a preliminary overview of the dynamic between COVID-19 and mental health during the initial stages of the pandemic in such countries. International studies during the COVID-19 pandemic are relevant given that each country has differentiated capabilities, economic, political, and social infrastructures, as each country responds differently to the current crisis (Yoo et al., 2020).

2. Methods

2.1. Participants

Participants were selected through a non-probabilistic sampling method. Data was collected through an online survey that was disseminated via snowball sampling and social media in the five countries involved in the study. The online survey contained an informed consent form which included the purpose of the study, an anonymity claim, a voluntary participation claim, and contact information for the main researcher. Of the total sample of 1559 respondents, 530 (34%) reported living in Honduras, 451 (29%) in Chile, 262 (17%) in Costa Rica, 173 (11%) in Mexico and 143 (9%) in Spain. Overall, all countries considered, the mean age of the respondents was of 33.49 years ($SD = 11.41$), 1113 (71.39%) were female and 446 (28.61%) males. Table 2 shows a description of the sociodemographic characteristics of the sample.

2.2. Data collection techniques

2.2.1. Brief Symptom Inventory-18 (BSI-18)

The Brief Symptom Inventory-18 (BSI-18) consists of three subscales: somatization, depression, and anxiety, with six items each. These scores range from 0 (no symptom expression) to 4 (high prevalence of symptomatic expression). The scores are added to create subscale totals and the sum of all 18 items creates the Global Severity Index. The BSI-18 properties have adequate levels of internal consistency and convergent validity estimates (Franke et al., 2017). It correlates significantly with the previous tests, the SCL-90-R and BSI-53 (Li et al., 2018) and it has a confirmed invariance across gender, which allows comparisons between men and women (Petrowski et al., 2018).

A Confirmatory Factor Analysis (CFA) was used to determine the fit of the original structure of the BSI-18. Overall, results indicate acceptable fit indexes (Kline, 2015): X^2 (132) = 1249.29, $p < .001$, CFI = 0.92, TLI = 0.91, NNFI = 0.91, RMSEA = 0.07, GFI = 0.91. Suggesting that the original three-dimensional structure of BSI-18 has an adequate fit in the selected sample. All subscales possess adequate internal consistency coefficients: somatization ($\alpha = 0.85$, average interitem correlation = 0.49), depression ($\alpha = 0.85$, average interitem correlation = 0.49), and anxiety ($\alpha = 0.86$, average interitem correlation = 0.50). The overall BSI-18 has a Cronbach's alpha of .93 with an average interitem correlation of 0.43.

2.2.2. Coronavirus Awareness Scale-6 (CAS-6)

Coronavirus Awareness was measured by a six-item, 5-point, Likert scale created by the authors of the current study. Responses range from 0 (totally disagree) to 4 (totally agree). An Exploratory Factor Analysis (EFA) was used to determine the structure of the Coronavirus Awareness Scale. This was made through a parallel analysis, maximum likelihood estimation method with an oblique-oblimin rotation. The preliminary analysis determined a KMO of 0.72, with a significant Barlett's test, X^2 (15) = 1843.54, $p < .001$ and overall Chi-squared test, X^2 (4) = 20.66, $p < .001$. The EFA suggests the presence of two factors, the first related to a Perceived Seriousness of COVID-19 ($\alpha = 0.68$) and the second one about Personal Concern ($\alpha = 0.65$), the overall CAS has a Cronbach's alpha of .72. This model had an acceptable RMSEA (0.05) and TLI (0.97), these scores are above the threshold used in similar studies (RMSEA $\leq$ 0.08 and TLI $\geq$ 0.90) (Li et al., 2018). A Confirmatory Factor Analysis (CFA) further supports the bi-dimensional structure of the CAS

Table 2
Description of sociodemographic variables by country.

Variable	Value	Country				
		Honduras	Chile	Costa Rica	Mexico	Spain
		Count (%)	Count (%)	Count (%)	Count (%)	Count (%)
Sex	Male	178 (33.60%)	102 (22.60%)	92 (35.10%)	37 (21.40%)	37 (25.90%)
	Female	352 (66.40%)	349 (77.40%)	170 (64.90%)	136 (78.60%)	106 (74.10%
Presence of children at home	No	333 (62.83%)	274 (60.75%)	211 (80.53%)	115 (66.47%)	108 (75.52%)
	Yes	197 (37.17%)	177 (39.25%)	51 (19.47%)	58 (33.53%)	35 (24.48%)
Presence of folder adults at home	No	306 (57.74%)	321 (71.18%)	183 (69.85%)	128 (73.99%)	108 (75.52%)
	Yes	224 (42.26%)	130 (28.82%)	79 (30.15%)	45 (26.01%)	35 (24.48%)
Employement status	Unemployed	213 (40.19%)	140 (31.04%)	76 (29.01%)	62 (35.84%)	64 (44.76%)
	Employed	317 (58.81%)	311 (68.96%)	186 (70.99%)	111 (64.16%)	79 (55.24%)
Health worker	No	358 (67.55%)	406 (90.02%)	200 (76.34%)	113 (65.32%)	125 (87.41%)
	Yes	172 (32.45%)	45 (9.98%)	62 (23.66%)	60 (34.68%)	18 (12.59%)

Note. Mean age: Honduras ($M = 28.94$, $SD = 8.60$), Chile ($M = 34.53$, $SD = 11.52$), Costa Rica ($M = 39.45$, $SD = 13.13$), Mexico ($M = 31.24$, $SD = 10.77$) and Spain ($M = 33.31$, $SD = 13.03$); the overall mean was of 33.49 years ($SD = 11.41$).

($X^2 = 87.26$, $df = 8$, $p < .001$; CFI = 0.96; TLI = 0.92, RMSEA = 0.08; GFI = 0.98). Both dimensions were significantly related to each other ($r = -36$, $p < .001$). See Table 3.

2.2.3. Psychological and sociodemographic questionnaire

Additional data was collected through a questionnaire containing psychological and sociodemographic questions. Sociodemographic questions included: respondent's country of residence, sex, age, amount of people living at home, presence of children at home (<12 years), presence of older adults at home (>60 years), work status (employed or unemployed), and work field (being or not a health worker).

Psychological items included a multiple response set that answered the question: "Has the current coronavirus (COVID-19) situation stressed you in any of the following areas of your life?". Such domains included: financial, family, peer group, religious, health, academic, and leisure time concerns. Additionally, respondents answered if they have felt stressed or not by being confined at home.

2.3. Data analysis

All data was processed and analyzed using JASP 0.12 (JASP Team, 2020). After determining the psychometric properties of the CAS-6 and the BSI-18, subscale and total scores were calculated for both instruments. Later, we describe the prevalence of the self-reported stress domains and their relationship with nominal variables (sex, employment status, being or not a health worker, country of residence), the association between variables was determined by a chi-square test and contingency coefficients. BSI-18 and CAS-6 scores were compared between health-workers and non-health-workers, using a Welch's *t*; ANOVA was used to make inter-country comparisons. Respondents were required to answer all items included in the questionnaire; therefore, missing data treatment was not necessary for the current research.

Independent stepwise linear regression models were used to determine the factors that explained variations in the BSI-18 subscales (Somatization, Depression, and Anxiety). The independent variables included: COVID-19 Perceived Seriousness and Personal Concern, age, sex, employment status, being or not a health worker, the number of people at home, presence of older adults (>60 years) and children (>12 years) at home, stress related to home confinement, financial, family, academic, leisure time constrains, peer group, health, and religious activities concern.

Table 3
Factor loadings for the two-dimensional loading resulting from the EFA.

Item	Perceived Seriousness	Personal Concern	Uniqueness
1. I am afraid of catching Coronavirus (COVID-19).	−0.03	**0.94**	0.14
2. I am concerned about the spread of Coronavirus (COVID-19).	0.20	**0.46**	0.69
3. I am not worried about getting Coronavirus (COVID-19).	0.27	**0.39**	0.70
4. The media exaggerates about the danger of contagion of the Coronavirus (COVID-19).	**0.44**	−0.02	0.81
5. I believe that quarantine measures to prevent the spread of Coronavirus (COVID-19) are exaggerated.	**0.67**	−0.03	0.56
6. I feel like this Coronavirus issue (COVID-19) is more paranoia than anything else.	**0.80**	0.02	0.35

Note. Significant loadings (>0.30) are marked in bold letters. Items 3, 4, 5 and 6 must be inversely recoded.

3. Results

3.1. Analysis of self-reported stress domain

When examining the domains, the respondents reported feeling stressed. A comparison of the responses shows that the most common concern corresponds to the family domain (22.97% of cases), followed by the financial domain (22.53%), academic concerns (16.47%), leisure time (14.23%), and health-related concerns (12.48%). Less prevalent domains include peer group (7.63%) and religious concerns (3.69%). The following associations are the result of chi-square tests.

There is a significant association between all stress domains and the respondent's country of residence ($p < .001$), except for the domain related to health concerns ($p > .05$) which is similar between all countries included in the study. On the other hand, Honduras, Costa Rica, and Mexico show the highest prevalence of financial stress (25.81%, 23.74%, and 23.25%, respectively). In Chile, the main stressors revolve around the family (25.58%), financial concerns (17.92%), and leisure time (17.66%).

Despite Spain's high COVID-19 incidence and mortality, the country's most prevalent stress domains prevalence is the family domain (22.65%), followed by financial (21.95%), academic (20.21%), health-related stress (12.89%), leisure time (12.54%), religious concerns (5.23%), and stress related to the peer group (4.53%). Additionally, family stress was significantly associated with the respondent's sex, X^2 (1) = 14.74, $p < .001$. Specifically, when compared to male subjects, women reported greater stress in the family domain, see Table 4.

Financial, academic, and religious stress domains are also significantly related to the respondent's employment status, $p < .001$. Unemployed subjects report more commonly stress related to the financial domain (23.55%) than those individuals currently employed (21.89%). For the unemployed, the academic stress domain has a higher incidence (21.09%), than for the employed (13.55%). Religious concern was more prevalent among the unemployed (4.26%) when compared to the employed (3.32%).

The family, financial, academic, health, and peer-related stress domains are significantly related to being or not a health worker, $p < .001$. Subjects employed in health-related areas (such as medics, nurses, hospital psychologists, etc.), when compared to the general population, reported a higher prevalence of stress related to their health, academic concerns, and peer-related stress. Of the total sample, 895 (57.41%) considered that home confinement caused them stress. This belief is significantly related to each stress domain, $p < .001$.

3.2. Coronavirus awareness and BSI-18 scores domains compared between health and non-health workers

Regarding Coronavirus Awareness, neither the Perceived Seriousness ($p = .60$, Cohen's $d = -0.03$) nor the Personal Concern ($p = .57$, $d = -0.03$) subscales show statistically significant differences between health and non-health workers. Similar results were found for the BSI-18 indicators, in which no difference was found in the inter-group comparison for the Somatization ($p = .07$, $d = 0.11$), Depression ($p = .53$, $d = -0.04$), and Anxiety ($p = .93$, $d = 0.01$) subscales, see Table 5.

3.3. Coronavirus awareness and BSI-18 scores compared by country

Regarding overall Coronavirus Awareness, Chile ($M = 3.34$, $SD = 0.63$), Mexico ($M = 3.29$, $SD = 0.64$), and Costa Rica ($M = 3.27$, $SD = 0.75$) obtained higher scores than Honduras ($M = 3.18$, $SD = 0.63$) and Spain ($M = 2.90$, $SD = 0.78$). These differences between means are considered statistically significant, F (4,1554) = 12.914, $p < .01$, $\eta^2 = 0.03$. Significant differences were also found for the Perceived Seriousness subscale ($p < .01$, $\eta^2 = 0.02$) and the Personal Concern subscale ($p < .01$, $\eta^2 = 0.04$).

The countries with the highest Global Severity Score are Chile ($M =$

Table 4
Self-reported stress domains compared by country, sex, employment status, being or not a health worker, and confinement stress.

Group		Domain						
		Family	Financial	Leisure time	Academic	Health	Peer group	Religious
Country *n* (% of row)	Honduras	282 (20.74)	351 (25.81)	156 (11.47)	236 (17.35)	173 (12.72)	89 (6.54)	73 (5.37)
	Chile	297 (25.58)	208 (17.92)	205 (17.66)	179 (15.42)	147 (12.66)	106 (9.13)	19 (1.64)
	Costa Rica	152 (24.72)	146 (23.74)	93 (15.12)	88 (14.31)	72 (11.71)	47 (7.64)	17 (2.76)
	Mexico	95 (20.83)	106 (23.25)	62 (13.60)	78 (17.11)	55 (12.06)	41 (8.99)	19 (4.17)
	Spain	65 (22.65)	63 (21.95)	36 (12.54)	58 (20.21)	37 (12.89)	13 (4.53)	15 (5.23)
	CC (χ^2)	.13 (25.74***)	.18 (50.61***)	.15 (34.74 ***)	.08 (10.21 *)	.05 (4.52)	.11 (19.43***)	.14 (30.03***)
Sex *n* (% of row)	Male	221 (20.67)	253 (23.67)	149 (13.94)	189 (17.68)	132 (12.35)	83 (7.76)	42 (3.93)
	Female	670 (23.84)	621 (22.10)	403 (14.34)	450 (16.01)	352 (12.53)	213 (7.58)	101 (3.59)
	CC (χ^2)	.10 (14.74 ***)	<.01 (0.11)	.03 (1.09)	.02 (0.50)	.02 (0.61)	<.01 (0.06)	<.01 (0.04)
Employment status *n* (% of row)	Unemployed	307 (20.43)	354 (23.55)	189 (12.57)	317 (21.09)	167 (11.11)	105 (6.99)	64 (4.26)
	Employed	584 (24.58)	520 (21.89)	363 (15.28)	322 (13.55)	317 (13.34)	191 (8.04)	79 (3.32)
	CC (χ^2)	.03 (1.19)	.11 (20.86 ***)	.02 (0.69)	.24 (92.69 ***)	.02 (0.37)	<.01 (<.01)	.06 (5.76*)
Health worker *n* (% of row)	No	665 (23.28)	655 (22.93)	422 (14.78)	459 (16.07)	346 (12.11)	208 (7.28)	101 (3.54)
	Yes	226 (22.09)	219 (21.41)	130 (12.71)	180 (17.60)	138 (13.49)	88 (8.60)	42 (4.11)
	CC (χ^2)	.07 (7.16 ***)	.06 (5.25) **	.01 (0.21)	.10 (17.03***)	.09 (12.53***)	.08 (9.65 ***)	.05 (3.73)
Confinement stress *n* (% of row)	No	309 (24.68)	328 (26.20)	122 (9.74)	221 (17.65)	151 (12.06)	73 (5.83)	48 (3.83)
	Yes	582 (22.15)	546 (20.78)	430 (16.37)	418 (15.91)	333 (12.68)	223 (8.49)	95 (3.62)
	CC (χ^2)	.18 (53.23 ***)	.11 (20.85 ***)	.29 (146.74***)	.13 (28.39***)	.15 (37.26***)	.17 (48.04***)	.06 (5.24*)
Total *n* (% of row)		891 (22.97)	874 (22.53)	552 (14.23)	639 (16.47)	484 (12.48)	296 (7.63)	143 (3.69)

Note. CC= Contingency Coefficient.
*$p < .05$, **$p < .01$, ***$p < .001$.

Table 5
Coronavirus Awareness and BSI-18 scores domains compared between health and non-health workers.

Scale	Work area	Mean	*SD*	*t*	*df*	*P*	Cohen's *d*
Coronavirus Awareness Total	Non health-worker	3.22	0.68	−0.65	577.44	.51	−0.04
	Health worker	3.25	0.69				
Perceived Seriousness	Non health-worker	3.11	0.84	−0.52	579.67	.60	−0.03
	Health worker	3.14	0.85				
Personal Concern	Non health-worker	3.33	0.80	−0.56	588.3	.57	−0.03
	Health worker	3.36	0.79				
Global Severity Index	Non health-worker	23.43	15.03	0.45	611.65	.65	0.03
	Health worker	23.03	14.21				
Somatization	Non health-worker	6.34	5.57	1.81	619.49	.07	0.11
	Health worker	5.76	5.19				
Depression	Non health-worker	7.57	5.55	−0.63	588.26	.53	−0.04
	Health worker	7.78	5.50				
Anxiety	Non health-worker	9.53	5.66	0.08	607.15	.93	0.01
	Health worker	9.50	5.39				

Note. The study included 357 health workers and 1202 non-health workers. The table includes data from the five countries included in the study.

27.16, $SD = 15.25$) and Honduras ($M = 23.64$, $SD = 14.50$). Lower scores were found for Mexico ($M = 20.22$, $SD = 15.07$), Costa Rica ($M = 20.02$, $SD = 13.75$), and Spain ($M = 20.00$, $SD = 13.56$), a One-Way ANOVA determined these differences to be significant, F (4, 1554) = 15.059, $p < .01$, $\eta^2 = 0.04$. Similar results were found for Somatization ($p < .01$, $\eta^2 = 0.03$), Depression ($p < .01$, $\eta^2 = 0.02$) and Anxiety ($p < .01$, $\eta^2 = 0.04$), see Table 6.

3.4. Linear regression analysis

3.4.1. Factors explaining the Global Severity Index

The resulting model explaining the Global Severity Index had an adjusted R^2 of 0.26, $f^2 = 0.35$, and is statistically significant, F (9, 1549) = 59.19, $p < .001$. Significant predictors ($p < .05$) included confinement stress ($\beta = 0.27$, $p < .001$), health-related stress ($\beta = 0.16$, $p < .001$), being female ($\beta = 0.15$, $p < .001$), age ($\beta = -0.12$, $p < .001$), leisure time-related stress ($\beta = 0.11$, $p < .001$), COVID-19 Personal Concern ($\beta = 0.12$, $p < .001$), COVID-19 Perceived Seriousness ($\beta = -0.08$, $p = .02$) and being a health worker ($\beta = -0.05$, $p = .02$), see Table 7.

3.4.2. Factors explaining somatization scores

The resulting model explaining somatization scores had an adjusted R^2 of 0.17, $f^2 = 0.20$, F (9, 1549) = 36.63, $p < .001$. Significant predictors ($p < .05$) included: confinement stress ($\beta = 0.21$, $p < .001$), health related stress ($\beta = 0.16$, $p < .001$), being female ($\beta = 0.16$, $p < .001$), leisure time related stress ($\beta = 0.09$, $p < .001$), being a health worker ($\beta = 0.07$, $p < .01$), COVID-19 Personal Concern ($\beta = 0.10$, $p < .001$), COVID-19 Perceived Seriousness ($\beta = -0.07$, $p < .01$), employment status ($\beta = -0.05$, $p = .03$) and age ($\beta = -0.05$, $p = .04$), see Table 7.

3.4.3. Factors explaining depression scores

The resulting model explaining depression scores had an adjusted R^2 of 0.20, $f^2 = 0.25$, F (8, 1550) = 49.16, $p < .001$. Significant predictors included: confinement stress ($\beta = 0.25$, $p < .001$), age ($\beta = -0.17$, $p < .001$), leisure time related stress ($\beta = 0.13$, $p < .001$), health-related stress ($\beta = 0.10$, $p < .001$), being female ($\beta = 0.08$, $p < .001$), COVID-19 Perceived Seriousness ($\beta = -0.07$, $p < .01$), academic-related stress ($\beta = 0.06$, $p = .02$) and religious related stress ($\beta = -0.05$, $p = .04$), see

Table 6
Between-country comparisons for Coronavirus Awareness and BSI-18 subscales.

Variable	Country	Mean	*SD*	*F*	*P*	η^2
Coronavirus Awareness Total	Honduras	3.18	0.63	12.914	<.01	0.03
	Chile	3.34	0.63			
	Costa Rica	3.27	0.75			
	Mexico	3.29	0.64			
	Spain	2.90	0.78			
	Total	3.23	0.68			
Perceived Seriousness	Honduras	3.00	0.83	8.273	<.01	0.02
	Chile	3.26	0.77			
	Costa Rica	3.20	0.89			
	Mexico	3.15	0.89			
	Spain	2.95	0.88			
	Total	3.12	0.84			
Personal Concern	Honduras	3.36	0.74	15.444	<.01	0.04
	Chile	3.42	0.76			
	Costa Rica	3.34	0.84			
	Mexico	3.43	0.69			
	Spain	2.86	0.99			
	Total	3.34	0.8			
Global Severity Index	Honduras	23.64	14.5	15.059	<.01	0.04
	Chile	27.16	15.25			
	Costa Rica	20.02	13.75			
	Mexico	20.22	15.07			
	Spain	20	13.56			
	Total	23.34	14.84			
Somatization	Honduras	6.04	5.32	13.052	<.01	0.03
	Chile	7.65	5.98			
	Costa Rica	5.12	4.73			
	Mexico	5.13	5.24			
	Spain	5.56	5.14			
	Total	6.2	5.48			
Depression	Honduras	8.03	5.62	8.349	<.01	0.02
	Chile	8.43	5.28			
	Costa Rica	6.68	5.7			
	Mexico	6.39	5.62			
	Spain	6.69	5.05			
	Total	7.61	5.54			
Anxiety	Honduras	9.58	5.55	17.503	<.01	0.04
	Chile	11.08	5.8			
	Costa Rica	8.22	5			
	Mexico	8.7	5.5			
	Spain	7.76	4.97			
	Total	9.52	5.6			

Note. Honduras ($n = 530$), Chile ($n = 451$), Costa Rica ($n = 262$), Mexico ($n = 173$) and Spain ($n = 143$); between groups $df = 4$, residuals $df = 1554$.

Table 7.

3.4.4. Factors explaining anxiety scores

The resulting model explaining anxiety scores had an adjusted R^2 of 0.27, $f^2 = 0.36$, $F(7, 1551) = 92.62$, $p < .001$. Significant predictors ($p < .05$) included: confinement stress ($\beta = 0.26$, $p < .001$), COVID-19 Personal Concern ($\beta = 0.20$, $p < .001$), health-related stress ($\beta = 0.18$, $p < .001$), being female ($\beta = 0.17$, $p < .001$), age ($\beta = -0.09$, $p < .001$), leisure time related stress ($\beta = 0.09$, $p < .001$), COVID-19 Perceived Seriousness ($\beta = -0.07$, $p < .01$), see Table 7.

4. Discussion

The results of our research indicate that participants report a higher prevalence of stress in the family, financial, leisure activities constrictions, and academic domains than health-related concerns. More so, unemployed respondents have higher scores in somatization and depression. Confinement related stress is the most significant predictor of anxiety, depression, and somatization scores. Therefore, many of the COVID-19 containment restrictions are affecting the economic, family, academic and recreational wellbeing; domains in which the participants reported more stress than in health-related topics. This finding might be explained by the confinement measures themselves, which may limit people's concern regarding COVID-19, as they are not as exposed to the virus as if they had free transit. Recent studies also suggest that restrictive government responses to the COVID-19 pandemic were associated with higher demand for crisis hotline calls (Arendt et al., 2020).

As mentioned before, a predominant stressor reported by the respondents was the financial domain (22.53%), resulting even higher than the concern for their health (12.48%). These seem to be counter-intuitive findings since people would be expected to be more concerned about not getting sick. However, the latest statistical reports for 2019, point out that countries like Honduras have a poverty rate of 48.3%. (World Bank, 2020); the Latin American region presents an unemployment rate of 8.1% (International Labor Organization, 2020), and 13.7% in Spain (National Institute of Statistics Spain, 2020). The socioeconomic impact of the current pandemic is therefore evident; concern over the lack of availability of economic resources, fear of a new recession, and financial collapse, are ideas that cause uncertainty in people and can harm their mental health (Nicola et al., 2020).

Previous research may provide a framework to understand the findings of the current study. In this sense, the intolerance of uncertainty and worry can be associated with psychological symptoms such as depression and anxiety (Dar et al., 2017). Considering the effects of COVID-19 fear, as well as the social and personal countermeasures, people's mental health could be affected by the unpredictability and uncertainty of the current crisis and the consequences in their way of living (Zandifar and Badrfam, 2020). These implications are seen in our study, with respondents reporting stress mainly caused by the concern for their families, financial situation, and health condition. Similar conclusions were found in a study carried in the United Kingdom, which found that anxiety, isolation, access to mental health support services, becoming mentally unwell, and concern regarding the wellbeing of friends and family were the primary worries reported among the population (Cowan, 2020).

Our research also determined the influence that COVID-19 awareness and confinement stress have over mental health indicators. Similar results were found in studies related to psychological distress among the Chinese population during the COVID-19 pandemic, indicating that the quarantine measures to contain the virus spread have triggered serious threats to mental wellbeing in terms of anxiety, depression, and panic disorders. Such results were also related to age, gender, education, occupation, and religion (Qui et al., 2020).

Given the implications of our findings, women, younger adults, and health-workers are at particular risk of experiencing somatization, anxiety, and depression symptoms. This finding is consistent with other studies that found that being a female health care professional in the COVID-19 context was associated with higher anxiety, depression (Lai et al., 2020; Vizheh et al., 2020), and vicarious traumatization in contrast with the general public and non-members of medical teams (Li et al., 2020). Consequently, public policy efforts should promote the development of mental health assistance targeting risk groups. These efforts can be effectively done by creating protocols for crisis intervention and using the advantages of telemedicine, such as China has done (Zhang et al., 2020). Creating these protocols can make a great difference in the effectiveness of medical teams, since it is proven that health care professionals can easily develop burnout syndrome which can consequently, increase the risk of medical malpractice (Patel et al., 2018).

Recent research has found that healthcare workers are not prioritizing mental health, instead, they focus on occupational protection, rest, and social support (Muller et al., 2020). The working conditions of the health staff should be flexible and modified in accordance with their

Table 7
Linear regression model explaining the Global Severity Index, Somatization, Depression and Anxiety scores.

Outcome	Predictors	Unstandardized		Standardized	*t*	*p*	VIF
		β	SE	B			
Global Severity Index	Confinement stress	8.04	0.71	0.27	11.38	<.001	1.15
	Health-related stress	5.1	0.74	0.16	6.88	<.001	1.11
	Sex	5	0.74	0.15	6.73	<.001	1.07
	Age	−0.15	0.03	−0.12	−4.98	<.001	1.14
	Leisure time-related stress	3.34	0.74	0.11	4.52	<.001	1.18
	COVID-19 Personal Concern	2.32	0.45	0.12	5.15	<.001	1.22
	COVID-19 Perceived Seriousness	−1.4	0.42	−0.08	−3.33	<.001	1.19
	Health worker	−1.88	0.79	−0.05	−2.38	0.02	1.04
	Academic-related stress	1.62	0.71	0.05	2.27	0.02	1.16
Somatization	(Intercept)	3.12	0.73		4.27	<.001	
	Confinement stress	2.34	0.27	0.21	8.5	<.001	1.16
	Health related-stress	1.93	0.29	0.16	6.71	<.001	1.11
	Sex	1.88	0.29	0.16	6.51	<.001	1.07
	Leisure time-related stress	1.01	0.28	0.09	3.55	<.001	1.16
	Health worker	0.92	0.31	0.07	3	<.01	1.04
	COVID-19 Personal Concern	0.67	0.18	0.1	3.82	<.001	1.23
	COVID-19 Perceived Seriousness	−0.46	0.16	−0.07	−2.82	<.01	1.19
	Employment status	−0.58	0.27	−0.05	−2.12	0.03	1.07
	Age	−0.02	0.01	−0.05	−2.04	0.04	1.11
Depression	(Intercept)	8.3	0.66		12.5	<.001	
	Confinement stress	2.84	0.27	0.25	10.47	<.001	1.14
	Age	−0.08	0.01	−0.17	−7.17	<.001	1.13
	Leisure time-related stress	1.5	0.29	0.13	5.23	<.001	1.19
	Health-related stress	1.18	0.28	0.1	4.15	<.001	1.1
	Sex	0.98	0.28	0.08	3.43	<.001	1.05
	COVID-19 Perceived Seriousness	−0.44	0.15	−0.07	−2.86	<.01	1.06
	Academic-related stress	0.63	0.27	0.06	2.3	0.02	1.16
	Religious-related stress	−0.92	0.45	−0.05	−2.05	0.04	1.06
Anxiety	(Intercept)	3.54	0.69		5.13	<.001	
	Confinement stress	2.96	0.26	0.26	11.28	<.001	1.15
	COVID-19 Personal Concern	1.38	0.17	0.2	8.21	<.001	1.22
	Health-related stress	2.17	0.27	0.18	7.93	<.001	1.1
	Sex	2.11	0.28	0.17	7.65	<.001	1.06
	Age	−0.05	0.01	−0.09	−4.24	<.001	1.03
	Leisure time-related stress	1.07	0.27	0.09	3.94	<.001	1.16
	COVID-19 Perceived Seriousness	−0.44	0.16	−0.07	−2.84	<.01	1.19

Note. All independent variables included: COVID-19 Perceived Seriousness and Personal Concern, age, sex (reference group = female), employment status, being or not a health worker, the number of people at home, presence of older adults (>60 years) and children (>12 years) at home, stress related to home confinement, financial, family, academic, leisure time constrains, peer group, health, and religious activities concern.

mental health needs (Zhang et al., 2020). Mental health interventions based on gender are also necessary to minimize psychological and social risks that might be exacerbated during the COVID-19 pandemic (Connor et al., 2020).

5. Limitations and future research

Although the results of our study provide valuable information for the design and implementation of public health policies on the COVID-19 situation, there are limitations to be considered. For instance, the representativeness of the sample, regarding both in size and selection method. Given that data collection was made through online questionnaires, respondents who voluntarily agreed to participate in the survey may be systematically different from non-participants. Future research should include probabilistic sampling methods to overcome this limitation.

The present research included a restricted number of mental health-related factors, based, particularly on a limited symptomatology. More research is needed to understand the positive aspects of mental health, such as subjective wellbeing, resilience, etc. Future studies should also focus on specific populations like children, health workers, confirmed COVID-19 cases, and their families. The current research could set a baseline for comparative studies made within the Iberian-American region, providing initial information about mental health indicators in health and non-health workers. Future research should also focus on the influence of socioeconomic variables (such as poverty and income) and their effect on mental health within the current pandemic.

6. Conclusions

The current findings corroborate the multidimensional detrimental effects that the COVID-19 pandemic has on mental health. Common reported stress domains included financial, academic, and family-related concerns. Significant predictors of mental health included confinement stress, health, academic, and leisure time-related stress, sex, age, being a health worker, Personal Concern, and Perceived Seriousness of COVID-19. These results should be considered in the design and execution of public health policies.

Authors contributions

Miguel Landa-Blanco: Conceptualization, Methodology, Formal analysis, Project administration, Supervision, Writing – original draft. Claudio J. Mejía: Conceptualization, Methodology, Investigation, Project administration, Supervision, Writing – original draft. Ana Lucía Landa-Blanco: Conceptualization, Methodology, Investigation, Project administration, Supervision, Writing – original draft. Carlos A. Martínez-Martínez: Conceptualization, Methodology, Investigation, Project administration, Supervision, Writing – original draft. Daniela Vásquez: Methodology, Investigation, Writing – original draft. Gabriela Vásquez: Methodology, Investigation, Writing – original draft. Paulo Moraga-Vargas: Methodology, Investigation, Writing – original draft. Yaraní Echenique: Methodology, Investigation, Writing – original draft. Glenda M. Del Cid: Methodology, Investigation, Writing – original draft. Brayan D. Montoya: Methodology, Investigation, Writing – original draft.

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Declaration of competing interest

The authors declare no conflict of interest.

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