

## Perceived stress and coping strategies during the COVID-19 lockdown in five countries

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**Abstract:** Several studies have shown how mental health could be affected during the COVID-19 pandemic, which led us to wonder about the psychological impact that the initial period of lockdown could have. We conducted a multicentric study that sought to describe, compare, and analyze the association between perceived stress, coping strategies and sociodemographic characteristics in a snowball-style convenience sample of 1169 participants from Colombia, Brazil, Mexico, Italy, and Spain who responded to an online survey. There were differences in perceived stress and coping strategies between countries and depending on sociodemographic characteristics. The variables positively associated with perceived stress were the coping strategies alcohol-drug use, focus on emotions and venting, being a woman, and living in Brazil, Italy, and Spain. The variables negatively associated with perceived stress were planning and active coping, positive reinterpretation, being over 45 years old, and being a worker. These results contribute to understanding the stress responses to lockdown and help identify vulnerability factors in order to design prevention and intervention programs.

**Keywords:** Perceived stress; coping strategies; COVID-19; lockdown; pandemic.

*Estrés percibido y estrategias de afrontamiento durante el confinamiento por COVID-19 en cinco países*

**Resumen:** Varios estudios han demostrado cómo la salud mental pudo verse afectada durante la pandemia de COVID-19, lo que nos llevó a preguntarnos sobre el impacto psicológico que podría tener el período inicial de confinamiento. Llevamos a cabo un estudio multicéntrico que buscó describir, comparar y analizar la asociación entre el estrés percibido, las estrategias de afronta-

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miento y las características sociodemográficas en una muestra de conveniencia tipo bola de nieve de 1169 participantes de Colombia, Brasil, México, Italia y España que respondieron un cuestionario en línea. Se encontraron diferencias en el estrés percibido y las estrategias de afrontamiento entre países y según características sociodemográficas. Las variables asociadas positivamente con el estrés percibido fueron las estrategias de afrontamiento consumo de alcohol y drogas, centrarse en las emociones y desahogo, ser mujer y vivir en Brasil, Italia y España. Las variables asociadas negativamente con el estrés percibido fueron planificación y afrontamiento activo, reinterpretación positiva, ser mayor de 45 años y ser trabajador. Estos resultados contribuyen a comprender las respuestas de estrés al confinamiento y ayudan a identificar factores de vulnerabilidad para diseñar programas de prevención e intervención.

**Palabras clave:** Estrés percibido; estrategias de afrontamiento; COVID-19; confinamiento; pandemia.

## Introduction

Experiences of lockdown or isolation due to pathogens affecting human health can generate psychological effects such as stress and coping difficulties (Babore et al., 2020; Di Fronso et al., 2020; Hawryluck et al., 2004). During the 2003 severe acute respiratory syndrome (SARS) epidemic, Sim et al. (2010) carried out a study on the general population in Singapore and their results showed that psychiatric morbidity was associated with being put in fever stations, younger age, increased sense of guilt, and less substance use, while post-traumatic morbidity was associated with a greater use of the coping strategies denial and planning. On the other hand, Main et al. (2011) showed that the number of stressors and the use of avoidant coping strategies positively predicted psychological symptoms. Active coping positively predicted life satisfaction when controlling for stressors. Additionally, all types of coping served as a buffer against the negative impact of stressors on perceived overall health (Main et al., 2011).

During the 2015 Middle East respiratory syndrome (MERS) epidemic, Khalid et al. (2016) investigated emotions, perceived stressors, and coping strategies in healthcare personnel working in a hospital in Jeddah (Saudi Arabia), finding that positive attitudes in the workplace as a coping strategy, clinical improvement of infected colleagues, and interruption of disease transmission among healthcare workers after taking strict protective measures eased their fear.

During the COVID-19 pandemic, Wang et al. (2020) published one of the first studies conducted in China finding that being a woman, being a student, self-rated specific physical symptoms (e.g., myalgia, dizziness, coryza), and poor health were significantly associated with a higher psychological impact of the outbreak and higher levels of stress, anxiety and depression. Up-to-date and accurate specific health information (e.g., on treatment and on the local outbreak situation) and particular precautionary measures (e.g., hand hygiene

and wearing a mask) were associated with a lower psychological impact of the outbreak and lower levels of stress, anxiety and depression.

Perceived stress refers to the relationship between people and their environment during an unexpected situation that requires great effort or exceeds the ability to cope, and which in turn can be evaluated as threatening (damage or obstacle) or stimulating (challenge) (Lazarus & Folkman, 1986). In contrast, stress coping strategies refer to the constantly changing cognitive and behavioral efforts that are developed to handle specific external and/or internal demands that are assessed as surplus or overflow of the individual's resources. At the same time, this process is changing since the subject sometimes uses some adaptive and other maladaptive strategies. The former are those oriented towards active coping with the stressful situation, and the latter correspond to avoidance behaviors (Lazarus & Folkman, 1986).

Carver et al. (1989) created the scale Coping Orientations to Problems Experienced (COPE) to measure different ways of coping through some problem-focused strategies such as active coping (actions or attempts to change the situation), planning (thinking about what to do or how to act), suppression of competing activities (avoiding other things to focus on the situation), restraint coping (waiting for the appropriate moment to act), or search for instrumental social support (looking for help or information). The scale also assesses emotion-focused strategies: seeking of emotional social support (looking for emotional or moral sympathy), positive reinterpretation (attempts to look for the positive aspects or opportunities from the situation), acceptance (receiving the experience as it occurs), denial (refusing to believe that the situation exists), turning to religion (using faith in god or divinities). Some less useful responses are focus on emotions and venting (concentrating on distress and talking constantly about it), behavioral and mental disengagement (reducing the efforts to solve and looking for activities that distract of the situation).

The COVID-19 pandemic led us to wonder about the psychological impact it has had and will have in the short, medium, and long term due to the lockdown and all their implications. Several studies have shown how mental health can be affected during a lockdown period (Brooks et al., 2020; Mækkelæ et al., 2020; Prati, 2021; Veer et al., 2021) and the COVID-19 pandemic in general (Bedoya-Cardona et al., 2021; Bedoya-Cardona, Arboleda-Gil et al., 2022; Bedoya-Cardona, Hansen-Rodríguez et al., 2022; Luo et al., 2020; Mestas et al., 2021; Salari et al., 2020; Sandín et al., 2020). Therefore, it is important to get to know perceptions, beliefs, emotions, and reactions regarding lockdown, since a measure of such magnitude and length of time, even if taken for the good of the population, can usually generate psychological distress in people (Rubin & Wessely, 2020).

To date, most of the studies on the subject, carried out in Asia, North America, Europe and Australia, have been retrospective, and have evaluated compliance with lockdown by means of ad-hoc scales (Jeong et al., 2016; Khalid et al., 2016; S. H. Lee et al., 2005; S. M. Lee et al., 2018; Main et al., 2011; Reynolds et al., 2008; Wang et al., 2020; Wu et al., 2009; Xie et al., 2011). Therefore, the present study aimed to describe, compare, and analyze the association between perceived stress, coping strategies, and sociodemographic characteristics such as sex, age, educational level, occupation, and cohabitation during the first phase of the COVID-19 lockdown, in a sample of the general population and university students from various countries in Europe and Latin America.

## Method

The present study is an observational and multicentric study approved by the Bioethics Committee and the Faculty of Psychology of the Colombian University Universidad Cooperativa de Colombia and carried out in collaboration with researchers from universities in Italy, Spain, Mexico, Brazil, and an international NGO (Spain). It followed the international ethical guidelines for health research involving human beings of the Council for International Organizations of Medical Sciences and the Declaration of Helsinki, since the data collection was only done through standardized questionnaires for the purposes of this study and did not involve a psychological or psychiatric diagnosis.

### Participants

The target population was the general population and university students, and the type of sampling was non-probabilistic snowball. The survey was completed by 1169

participants (27.4% male) aged between 15 and 76 years ( $M = 33.49$ ,  $SD = 13.39$ ) from Colombia ( $n = 355$ ), Brazil ( $n = 364$ ), Mexico ( $n = 193$ ), Italy ( $n = 166$ ), and Spain ( $n = 91$ ). The specific countries included were non-probabilistically chosen for convenience, in that researchers from different universities participated in this multicenter study.

### Instruments

The first part of the digital questionnaire contained sociodemographic questions about sex, age, educational level, occupation, and cohabitation during the first phase of the COVID-19 lockdown. Then, the following instruments were included:

*The Perceived Stress Scale* (PSS; Cohen et al., 1983; Spanish version by Remor, 2006; Portuguese version by Luft et al., 2007; Italian version by Mondo et al., 2021). The PSS contains 14 items assessing the perception of stress in unexpected situations that occurred in the last month. It is scored using a Likert scale from 0 (*never*) to 4 (*very often*). In the present study, the instrument had good internal consistencies in the total sample and in the three different language versions ( $\alpha = .87$ ).

*The Coping Orientations to Problems Experienced* (COPE; Carver et al., 1989; Spanish version by Crespo & Cruzado, 1997; Italian version by Sica et al., 2008). Scale that contains 60 items evaluating 15 coping strategies (seeking social support, turning to religion, humor, alcohol-drug use, planning and active coping, abandonment of coping efforts, focus on emotions and venting, acceptance, denial, restraint coping, concentrating efforts to solve the situation, personal growth, positive reinterpretation, activities distracting from the situation, and disengagement). It is scored on a 4-point Likert scale (1 = *I never do it*, 2 = *I do it sometimes*, 3 = *I do it frequently*, 4 = *I do it many times*). It can be either applied in a dispositional way when it refers to habitual coping in stressful situations, or in a situational way in response to some stressful experience in the past three months. In the present study the latter was used in relation to lockdown. In the present study, the total scale showed good internal consistencies in the total sample and in the three versions by language ( $\alpha = .85 - .88$ ). Since there is no standardized version in Portuguese, an ad-hoc translation was carried out using a translation/back translation or reverse translation method (Brislin, 1986), i.e., a procedure involving a series of steps that allow the confirmation of the semantic and conceptual equivalence between the original instrument and the translated version. In order to work out this method, the guidelines of the International Test Commission summarized by Muñoz et al. (2013) were followed.

### Procedure

Before starting this study, pilot tests of the three versions of the questionnaire (Spanish, Italian and Portuguese) were performed by administering them to approximately four to six subjects, in order to verify the understanding of the questions, the questionnaire's technical adequacy, the ease of access from computers and mobile phones, the linguistic aspects, etc. Data were collected in all the countries involved between April and June 2020 using an online questionnaire drawn up by means of the free software Google Forms® and disseminated through institutional web pages, newsletters, e-mails, WhatsApp, Instagram, and Facebook. Participants were asked to share the link with their own contacts. Informed consent was obtained online from participants. The survey was anonymous and confidentiality of information was assured.

### Data analysis

Since the online questionnaire design contained the forced answering option, there were no missing data. Cronbach's alpha was calculated to estimate the internal consistency of the PSS and COPE total scales and subscales in the total sample and in the three different language versions. Since for the comparison of groups, Cronbach's alpha values from .70 to .80 are considered satisfactory (Bland & Altman, 1997), in the present study only the COPE subscales with values above .70 in the total sample were used for analysis. Normality tests (Kolmogorov-Smirnov) were performed to identify the type of distribution of each variable, finding that none of them exhibited a normal distribution. Because of that, the age category was divided into two groups from the median, corresponding to 44 years. In addition, non-parametric statistics were performed. In order to compare differences in medians, Kruskal-Wallis tests with post-hoc pairwise comparisons using Dunn's tests with Bonferroni corrections were employed. Spearman correlations were used to explore the relationship between the different variables. Finally, to analyze the association between perceived stress, coping strategies and sociodemographic variables, Generalized Linear Models (GLM) were employed. GLM are an extension of linear models that allow the use of non-normal distributions and non-constant variances, with a Gaussian distribution and a relationship function between the dependent variable and the independent variable of type Identity. The final multivariate GLM was selected by using the lowest Akaike's Information Criterion (*AIC*), the normal residual distribution, and

the variance inflation factor (*VIF*) to verify the absence of multicollinearity in post-estimation tests. In order to make comparisons between the countries, models were explored separately for each country and regrouped as follows: Latin America vs. Europe, Latin America vs. Central America vs. Europe, Spanish vs. Portuguese vs. Italian speakers, Colombia and Mexico vs. Brazil vs. Europe. This last group showed the lowest *AIC*. In all analyses,  $p < .05$  was considered statistically significant. Analyses were performed using the STATA 16 Software.

### Results

Table 1 shows Cronbach's alpha for each global scale and subscale of the original version (English; Carver et al., 1989; Cohen et al., 1983), and the validated different language versions (Spanish: Crespo & Cruzado, 1997; Remor, 2006. Italian: Mondo et al., 2021; Sica et al., 2008. Portuguese: Luft et al., 2007) from the original studies and the present study. In general, it can be said that the alpha values were quite similar for the three different language versions of the present study and with respect to the original and/or previously validated versions. However, because some scales, such as abandonment of efforts, acceptance, denial, restraint coping, concentrating on efforts to solve the situation, personal growth, positive reinterpretation, activities distracting from the situation, and disengagement presented alpha values lower than .70, they were not included in the rest of the analyzes.

Table 2 shows that the greatest part of the total sample and each country was composed of women, youth and adults, with a high level of education, most of whom were studying, working, and living with family during the lockdown period.

In Table 3 can be seen that there were significant differences in the medians of perceived stress and coping strategies between the five countries analyzed both separately and regrouped (Colombia/Mexico, Brazil, Italy/Spain). The median of perceived stress in Colombia was lower than in the other countries. Also, the median of perceived stress in Mexico was lower than in Brazil. In regard to differences in the medians of coping strategies, the median of seeking social support in Brazil was higher than in other countries. Turning to religion was more used in Latin American countries; humor was less used in Italy, and among the regrouped countries there was greater use of it in Colombia and Mexico; alcohol-drug use was higher in Colombia; planning and active coping and focusing on emotions and venting were most used in Colombia and Brazil; positive reinterpretation was higher in Colombia and Mexico.

Table 1. Cronbach's alpha for the PSS and COPE scales

|   | Original English version<br>$\alpha$                     | Different language versions in original studies |                        |                       | Different language versions in the present study |                        |                     | Total sample in the present study<br>$\alpha$ |
|---|--|---|------------------------|-----------------------|--|------------------------|---------------------|---|
|   |  | Spanish<br>$\alpha$                             | Portuguese<br>$\alpha$ | Italian<br>$\alpha$   | Spanish<br>$\alpha$                              | Portuguese<br>$\alpha$ | Italian<br>$\alpha$ |   |
| Perceived stress                                | .84 <sup>a</sup><br>.85 <sup>b</sup><br>.86 <sup>c</sup> | .81 <sup>d</sup>                                | .82 <sup>e</sup>       | .75 <sup>f</sup>      | .87  | .87                    | .87                 | .87   |
| Coping strategies total scale                   | NR <sup>a</sup>  | NR <sup>a</sup>                                 | †                      | .70 -.91 <sup>d</sup> | .88  | .87                    | .85                 | .87   |
| COPE subscales                                  |  |   |                        |                       |  |                        |                     |   |
| Seeking social support                          | .85  | .91   |                        |                       | .86  | .81                    | .87                 | .85   |
| Turning to religion                             | .92  | .93   |                        |                       | .90  | .90                    | .96                 | .91   |
| Humor   | NR   | .92   |                        |                       | .92  | .89                    | .86                 | .90   |
| Alcohol-drug use                                | NR   | .92   |                        |                       | .95  | .95                    | .93                 | .95   |
| Planning and active coping                      | .80  | .78   |                        |                       | .82  | .79                    | .76                 | .79   |
| Abandonment of efforts                          | .68  | .75   |                        |                       | .65  | .64                    | .72                 | .66   |
| Focus on emotions and venting                   | .77  | .80   |                        |                       | .78  | .71                    | .79                 | .77   |
| Acceptance                                      | .65  | .66   |                        |                       | .76  | .53                    | .77                 | .69   |
| Denial  | .71  | .63   |                        |                       | .53  | .46                    | .33                 | .47   |
| Restraint coping                                | .72  | .60   |                        |                       | .49  | .40                    | .57                 | .50   |
| Concentrating on efforts to solve the situation | .62  | .65   |                        |                       | .59  | .55                    | .54                 | .57   |
| Personal growth                                 | .68  | .60   |                        |                       | .61  | .65                    | .75                 | .64   |
| Positive reinterpretation                       | .68  | .64   |                        |                       | .76  | .81                    | .74                 | .77   |
| Activities distracting from the situation       | .45  | .32   |                        |                       | .14  | .27                    | .41                 | .22   |
| Disengagement                                   | .63  | .37   |                        |                       | .39  | .24                    | .38                 | .35   |

Note. <sup>a,b</sup> college student samples; <sup>c</sup> smoking-cessation sample; <sup>d</sup> adults from the general population; <sup>e</sup> elderly; <sup>f</sup> adult precarious workers; NR = not reported; †Ad-hoc translation; COPE = the Coping Orientations to Problems Experienced scale.

Table 4 shows that there were significant differences for almost all socio-demographic characteristics in the total sample, except for seeking social support and humor by age; alcohol-drug use by educational level and occupation; and positive reinterpretation by sex. Furthermore, among cohabiting groups, differences were only found in turning to religion (higher medians in those living with family) and alcohol-drug use (slightly higher medians for those living alone or with roommates). The medians of perceived stress and focus on emotions and venting were higher in women, people under 45 years, with low educational levels, and students. The coping strategies seeking social support and turning to religion were higher in women, people over 45 years, with high educational levels, and workers. Humor was higher in men, with high education and workers. Alcohol-drug use was higher in men and youth. Planning and active coping was higher in men, over 45 years, with high

educational level and workers. Positive reinterpretation was higher in people over 45 years, with high education and workers.

Spearman's correlations between perceived stress and coping strategies were calculated. We found that only social support did not present a statistically significant correlation with stress, while moderate and weak but statistically significant correlation coefficients were found for the other strategies (see Table 5). Besides, as expected and theoretically proposed (Carver et al., 1989; Folkman & Lazarus, 1985), the relationship between stress and the coping strategies turning to religion, humor, planning and active coping, and positive reinterpretation was negative, while its relationship with alcohol or drug use and focus on emotion and vent were positive. Furthermore, the correlation coefficients of the coping strategies with each other were also reviewed and it could be verified that there was no multicollinearity.

Table 2. Distribution of the study population by sociodemographic characteristics and countries

| Variables                 | Total Sample<br><i>n</i> (%) | Countries<br><i>n</i> (%) |            |            |            |           |
|---------------------------|------------------------------|---------------------------|------------|------------|------------|-----------|
|                           |                              | Colombia                  | Brazil     | Mexico     | Italy      | Spain     |
| Sex                       |                              |                           |            |            |            |           |
| Male                      | 320 (27.4)                   | 112 (31.5)                | 83 (22.8)  | 50 (25.9)  | 38 (22.9)  | 37 (40.6) |
| Female                    | 849 (72.6)                   | 243 (68.4)                | 281 (77.2) | 143 (74.1) | 128 (77.1) | 54 (59.3) |
| Age (years)               |                              |                           |            |            |            |           |
| 15-44                     | 689 (58.9)                   | 211 (59.4)                | 196 (53.8) | 142 (73.6) | 96 (57.8)  | 44 (48.4) |
| 45-76                     | 480 (41.0)                   | 144 (40.6)                | 168 (46.1) | 51 (26.4)  | 70 (42.2)  | 47 (51.6) |
| Educational level         |                              |                           |            |            |            |           |
| Elementary/high school    | 311 (26.6)                   | 81 (22.8)                 | 57 (15.7)  | 46 (23.8)  | 80 (48.2)  | 47 (51.6) |
| Professional/postgraduate | 858 (73.4)                   | 274 (77.2)                | 307 (84.3) | 147 (76.2) | 86 (51.8)  | 44 (48.4) |
| Occupation                |                              |                           |            |            |            |           |
| Student/worker            | 530 (45.3)                   | 169 (47.61)               | 136 (37.4) | 123 (63.7) | 70 (42.2)  | 32 (35.2) |
| Worker/other              | 639 (54.7)                   | 186 (52.39)               | 228 (62.6) | 70 (36.3)  | 96 (57.8)  | 59 (64.8) |
| Lives with                |                              |                           |            |            |            |           |
| Family                    | 1029 (88.3)                  | 324 (91.3)                | 327 (90.8) | 190 (98.4) | 129 (77.7) | 59 (64.8) |
| Alone or roommates        | 136 (11.7)                   | 31 (8.7)                  | 33 (9.2)   | 3 (1.6)    | 37 (22.3)  | 32 (35.2) |

Table 3. Comparison of medians and interquartile ranges (*IQR*) of perceived stress and coping strategies by separated and regrouped countries

|                     | Total sample                               | Coping strategies            |                          |  |                          |                                    |                          |                          |                          |
|---------------------|--|------------------------------|--------------------------|--|--------------------------|------------------------------------|--------------------------|--------------------------|--------------------------|
|                     |  | PS                           | SSS                      | TRL                                      | HUM                      | ADU                                | PAC                      | FEV                      | PRI                      |
|                     |  | Median<br>( <i>IQR</i> )     | Median<br>( <i>IQR</i> ) | Median<br>( <i>IQR</i> )                 | Median<br>( <i>IQR</i> ) | Median<br>( <i>IQR</i> )           | Median<br>( <i>IQR</i> ) | Median<br>( <i>IQR</i> ) | Median<br>( <i>IQR</i> ) |
|                     |  | 26 (14)                      | 19 (8)                   | 10 (8)                                   | 7 (6)                    | 4 (0)                              | 14 (5)                   | 8 (4)                    | 8 (3)                    |
| Separated countries | 1 Colombia                                 | 23 (12)                      | 18 (9)                   | 11 (6)                                   | 8 (5)                    | 4 (0)                              | 15 (6)                   | 8 (4)                    | 9 (3)                    |
|                     | 2 Brazil                                   | 29 (13)                      | 20 (7)                   | 11 (7)                                   | 7 (4.5)                  | 4 (1)                              | 15 (6)                   | 9 (3)                    | 8 (3)                    |
|                     | 3 Mexico                                   | 26 (14)                      | 18 (9)                   | 11 (7)                                   | 8 (6)                    | 4 (0)                              | 14 (6)                   | 8 (5)                    | 8 (4)                    |
|                     | 4 Italy                                    | 28 (12)                      | 19 (7)                   | 4 (4)                                    | 6 (4)                    | 4 (0)                              | 14 (6)                   | 8 (4)                    | 8 (4)                    |
|                     | 5 Spain                                    | 28 (14)                      | 19 (9)                   | 4 (5)                                    | 8 (7)                    | 4 (2)                              | 13 (5)                   | 9 (4)                    | 8 (3)                    |
|                     | Total differences <sup>a</sup>             | ****                         | ****                     | ****                                     | **                       | **                                 | ****                     | ****                     | *                        |
|                     | Differences between countries <sup>b</sup> | 1:2****<br>1:3*              | 2:1****<br>2:3***        | 4:1****<br>4:2****                       | 1:5***<br>3:5*           | 1:2**<br>1:4**                     | 1:3****<br>1:4***        | 1:2****<br>2:3***        | 1:4**                    |
|                     |  | 1:4****<br>1:5****<br>3:2*** | 2:5**                    | 4:3****<br>5:1****<br>5:2****<br>5:3**** |                          | 1:5***<br>2:3**<br>2:4***<br>2:5** | 2:5**                    |                          |                          |
| Regrouped countries | 1 Colombia & Mexico                        | 23 (12)                      | 18 (9)                   | 11 (6.5)                                 | 8 (5)                    | 4 (0)                              | 15 (6)                   | 8 (4)                    | 9 (3)                    |
|                     | 2 Brazil                                   | 29 (13)                      | 20 (7)                   | 11 (7)                                   | 7 (4.5)                  | 4 (1)                              | 15 (6)                   | 9 (3)                    | 8 (3)                    |
|                     | 3 Italy & Spain                            | 28 (13)                      | 19 (8)                   | 4 (4)                                    | 7 (5)                    | 4 (1)                              | 13 (5)                   | 8 (4)                    | 8 (3)                    |
|                     | Total differences <sup>a</sup>             | ****                         | ****                     | ****                                     | ***                      | **                                 | ****                     | ****                     | ND                       |
|                     | Differences between countries <sup>b</sup> | 1:2****<br>1:3****           | 2:1****<br>2:3***        | 1:3****<br>2:3****                       | 1:2**<br>1:3***          | 1:2**                              | 1:3****<br>2:3****       | 1:2****<br>2:3***        | 1:3**                    |

Note. PS = perceived stress; SSS = seeking social support; TRL = turning to religion; HUM = humor; ADU = alcohol-drug use; PAC = planning and active coping; FEV = focus on emotions and venting; PRI = positive reinterpretation; <sup>a</sup>Kruskal-Wallis test; <sup>b</sup>Dunn-test with Bonferroni correction; \*\*\*\* $p < .0001$ , \*\*\* $p < .001$ , \*\* $p < .01$ , \* $p < .05$ , ND = no differences.

Table 4. Comparison of medians and interquartile ranges (*IQR*) of perceived stress and coping strategies by sociodemographic characteristics

| Sociodemographic characteristics | PS<br>Median<br>( <i>IQR</i> ) | Coping strategies               |                                 |                                 |                                 |                                 |                                 |                                 |
|----------------------------------|--------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
|                                  |                                | SSS<br>Median<br>( <i>IQR</i> ) | TRL<br>Median<br>( <i>IQR</i> ) | HUM<br>Median<br>( <i>IQR</i> ) | ADU<br>Median<br>( <i>IQR</i> ) | PAC<br>Median<br>( <i>IQR</i> ) | FEV<br>Median<br>( <i>IQR</i> ) | PRI<br>Median<br>( <i>IQR</i> ) |
| Sex                              | ****                           | **                              | ****                            | ****                            | **                              | **                              | ****                            | ND                              |
| Male                             | 23 (12)                        | 18 (8)                          | 9 (8)                           | 8 (6)                           | 4 (1)                           | 15 (6)                          | 8 (3)                           | 8 (2.5)                         |
| Female                           | 28 (13)                        | 19 (7)                          | 10 (8)                          | 7 (5)                           | 4 (0)                           | 14 (5)                          | 9 (4)                           | 8 (3)                           |
| Age                              | ****                           | ND                              | ****                            | ND                              | **                              | ****                            | ****                            | ****                            |
| 15-44                            | 29 (14)                        | 18 (8)                          | 9 (9)                           | 7 (6)                           | 4 (1)                           | 14 (6)                          | 9 (4)                           | 8 (3)                           |
| 45-76                            | 22 (12)                        | 19 (7)                          | 11 (6)                          | 7 (6)                           | 4 (0)                           | 16 (5.5)                        | 8 (3)                           | 9 (3)                           |
| Educational level                | ****                           | ****                            | ****                            | **                              | ND                              | ****                            | **                              | ****                            |
| Elementary/high school           | 29 (13)                        | 18 (7)                          | 8 (8)                           | 7 (5)                           | 4 (1)                           | 13 (5)                          | 9 (4)                           | 8 (3)                           |
| Professional/postgraduate        | 25 (13)                        | 19 (7)                          | 10 (8)                          | 8 (5)                           | 4 (0)                           | 15 (6)                          | 8 (3)                           | 9 (3)                           |
| Occupation                       | ****                           | **                              | **                              | **                              | ND                              | ****                            | ****                            | ****                            |
| Student/worker                   | 29 (13)                        | 18 (8)                          | 9 (9)                           | 7 (5)                           | 4 (1)                           | 13 (5)                          | 9 (5)                           | 8 (3)                           |
| Worker/other                     | 23 (13)                        | 20 (7)                          | 10 (8)                          | 7 (5)                           | 4 (0)                           | 15 (5)                          | 8 (3)                           | 9 (3)                           |
| Lives with                       | ND                             | ND                              | ****                            | ND                              | **                              | ND                              | ND                              | ND                              |
| Family                           | 26 (14)                        | 19 (8)                          | 10 (8)                          | 7 (6)                           | 4 (0)                           | 14 (6)                          | 8 (4)                           | 8 (3)                           |
| Alone or roommates               | 26 (13.5)                      | 19 (7)                          | 7 (7)                           | 7 (4)                           | 4 (2)                           | 14 (6)                          | 8 (3)                           | 8 (4)                           |

Note. PS = perceived stress; SSS = seeking social support; TRL = turning to religion; HUM = humor; ADU = alcohol-drug use; PAC = planning and active coping; FEV = focus on emotions and venting; PRI = positive reinterpretation; \*\*\*\* $p < .0001$ , \*\*\* $p < .001$ , \*\* $p < .01$ , ND = no differences.

Table 5. Spearman correlations between perceived stress and coping strategies

| Coping strategies | PS<br>$r_s$ | SSS<br>$r_s$ | TRL<br>$r_s$ | HUM<br>$r_s$ | ADU<br>$r_s$ | PAC<br>$r_s$ | FEV<br>$r_s$ |
|-------------------|-------------|--------------|--------------|--------------|--------------|--------------|--------------|
| SSS               | .02         |              |              |              |              |              |              |
| TRL               | -.16****    | .16****      |              |              |              |              |              |
| HUM               | -.07**      | .08***       | .02          |              |              |              |              |
| ADU               | .23****     | .00          | -.16****     | .11****      |              |              |              |
| PAC               | -.36****    | .45****      | -.28.00****  | .18****      | -.04         |              |              |
| FEV               | .56****     | .38****      | .00          | -.00         | .19****      | .03          |              |
| PRI               | -.37****    | .34****      | .23****      | .19****      | -.08**       | .57****      | -.06*        |

Note. PS = perceived stress; SSS = seeking social support; TRL = turning to religion; HUM = humor; ADU = alcohol-drug use; PAC = planning and active coping; FEV = focus on emotions and venting; PRI = positive reinterpretation;  $r_s$  = Spearman correlation coefficient; \*\*\*\* $p < .0001$ , \*\*\* $p < .001$ , \*\* $p < .01$ , \* $p < .05$ .

In order to analyze the association between perceived stress, coping strategies and sociodemographic variables, univariate and multivariate GLM were used (see Table 6). The most functional model (Model 5) to predict perceived stress during the lockdown period included the coping strategies alcohol-drug use and focus on emotions and venting, and the socio-demographic characteristics female sex (compared to male) and

living in Brazil, Italy, and Spain (compared to Colombia and Mexico), all positive associations. Instead, the variables negatively associated with perceived stress during lockdown were the coping strategies planning and positive reinterpretation and the socio-demographic characteristics being over 45 years old (compared to being under 44 years of age) and being a worker (compared to being a student).

Table 6. Univariate and multivariate GLM of perceived stress, coping strategies and sociodemographic characteristics

| Perceived stress                       | Univariate<br>Models<br><i>b</i> | Multivariate models |                     |                     |                     |                     |
|--|----------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
|  |                                  | Model 1<br><i>b</i> | Model 2<br><i>b</i> | Model 3<br><i>b</i> | Model 4<br><i>b</i> | Model 5<br><i>b</i> |
| Coping strategies                      |                                  |                     |                     |                     |                     |                     |
| Seeking social support                 | 0.03                             |                     |                     | -0.02               | -0.08               |                     |
| Turning to religion                    | -0.39**                          |                     |                     | -0.08               | -0.01               |                     |
| Humor                                  | -0.21*                           |                     |                     | 0.04                | 0.09                |                     |
| Alcohol-drug use                       | 0.90**                           |                     |                     | 0.32**              | 0.33**              | 0.36**              |
| Planning and active coping             | -0.92**                          |                     |                     | -0.64**             | -0.46**             | -0.50**             |
| Focus on emotions and venting          | 1.90**                           |                     |                     | 1.82**              | 1.60**              | 1.55**              |
| Positive reinterpretation              | -1.60**                          |                     |                     | -0.72**             | -0.77**             | -0.77**             |
| Sex (“male” as reference category)     | 4.62**                           | 3.58**              |                     |                     | 1.95**              | 1.80**              |
| Age (years)                            |                                  |                     |                     |                     |                     |                     |
| 15-44 (reference category)             |                                  |                     |                     |                     |                     |                     |
| 45-76                                  | -6.20**                          | -4.12**             |                     |                     | -2.38**             | -2.30**             |
| Educational level                      |                                  |                     |                     |                     |                     |                     |
| High school (reference category)       |                                  |                     |                     |                     |                     |                     |
| Professional/postgraduate              | -3.78**                          | -1.46*              |                     |                     | 0.03                |                     |
| Occupation                             |                                  |                     |                     |                     |                     |                     |
| Student/worker (reference category)    |                                  |                     |                     |                     |                     |                     |
| Worker/other                           | -5.90**                          | -3.62**             |                     |                     | -1.83**             | -1.86**             |
| Lives with                             |                                  |                     |                     |                     |                     |                     |
| Family (reference category)            |                                  |                     |                     |                     |                     |                     |
| Alone or roommates                     | 0.22                             | 0.75                |                     |                     | 0.32                |                     |
| Country                                |                                  |                     |                     |                     |                     |                     |
| Colombia & Mexico (reference category) |                                  |                     |                     |                     |                     |                     |
| Brazil                                 | 4.50**                           | 5.38**              | 4.50**              |                     | 3.39**              | 3.22**              |
| Italy & Spain                          | 3.72**                           | 4.07**              | 3.72*               |                     | 2.76**              | 2.73**              |
| Constant                               |                                  | 25.74**             | 24.03**             | 24.68**             | 23.02**             | 23.31**             |
| <i>AIC</i>                             |                                  | 7.09                | 7.30                | 6.66                | 6.55                | 6.54                |

Note. *b* = regression coefficient; \*\*  $p < .01$ , \*  $p < .05$ ; AIC = Akaike’s Information Criterion.

## Discussion

The present study aimed to describe, compare, and analyze the association between perceived stress, coping strategies, and sociodemographic characteristics during the COVID-19 lockdown in Colombia, Brazil, Mexico, Italy, and Spain. Results showed that there were statistically significant differences between the countries. Namely, the median of perceived stress in Colombia was lower than in the other countries. Also, the median of perceived stress in Mexico was lower than in Brazil. In regard to differences in the medians of coping strategies, the median of seeking social support in Brazil

was higher than in other countries. The medians show that turning to religion was more used in Latin American countries; humor was less used in Italy, and among the regrouped countries there was greater use of it in Colombia and Mexico; alcohol-drug use was higher in Colombia; planning and active coping and focusing on emotions and venting were most used in Colombia and Brazil; positive reinterpretation was higher in Colombia and Mexico.

Although earlier studies have compared psychological aspects during lockdown and the COVID-19 pandemic in different countries (Mækellæ et al., 2020; Makarowski et al., 2020), not all of them have included the same



countries or instruments as the present study. However, given that the orientations of the citizens of the same country tend to be shaped by a national culture (De Vaus et al., 2018), it is expected that there will be cross-cultural differences concerning stressors and coping strategies (Heppner, 2008; Wong & Wong, 2006). Nevertheless, it is possible to argue that the differences between countries in the present study, in addition to cultural factors (Aldwin, 2004; Chun et al., 2006), may be due to less restrictive and less clear containment, lockdown, and isolation measures in Latin America than in Europe (Guan et al., 2020; Mækelæ et al., 2020).

For example, it can be observed that in Italy and Spain the state of alarm and the lockdown lasted longer because there the outbreak occurred earlier than in Latin American countries. Another crucial aspect is the term applied to the containment measures and the effect that this could generate on the citizens' perception: in Italy they were referred to as *lockdown*, in Spain as *confinement*, in Brazil as *social distancing*, in Colombia as *preventive isolation* and in Mexico as *healthy distance*. Despite these elements, it is important to continue analyzing how cultural factors can contribute to the success or failure of measures to contain a pandemic at a global level.

There were significant differences in the perceived stress levels for all the socio-demographic characteristics in the total sample, except for cohabitation during lockdown. Namely, women had higher perceived stress levels which is consistent with previous studies (Babore et al., 2020; Broche-Pérez et al., 2020; Qiu et al., 2020; Rossi et al., 2020; Wang et al., 2020) and could hypothetically be explained by the characteristics of women's role in society, which implies an overload of responsibilities in the workplace, at home, and in child and family care (Alon et al., 2020).

As reported in previous studies, concerning the age groups we found that during the COVID-19 pandemic stress levels were higher in people under 45 years of age (Dai et al., 2020), who, according to Salari et al. (2020), were more concerned about the consequences at a professional and economic level. Furthermore, young people were more exposed to large amounts of information through social networks and the media (Garfin, 2020; Hossain et al., 2020; Martínez-Taboas, 2020). Also, it may be hypothesized that younger people have not yet developed the emotional maturity in order to deal with situations of frustration. Another source of discomfort was the fact that their socialization and learning processes had been interrupted (Sun & Su, 2020).

There were also differences in perceived stress between elementary and high school educational level

and professionals and postgraduates, which can be explained by the fact that people with a low education level tend to make more use of unreliable media and are more influenced by conspiracy theories (Hossain et al., 2020; Martínez-Taboas, 2020). Moreover, in regard to occupation, there were differences between students and workers, and workers and others (i.e., housewives, unemployed, and retired people). Nonetheless, as reported in previous investigations (Odriozola-González et al., 2020), students were the most stressed category during lockdown. Despite lockdown and all the changes it entailed from a professional viewpoint causing an increase in the burden for a large part of the workers, it can be argued that being employed under these pandemic circumstances turns out to be a protective factor not only against possible financial losses, but also helping maintain well-being, giving access to support from colleagues and contributing to sense of life (Crayne, 2020).

While investigating if there were differences in the use of coping strategies according to sociodemographic characteristics, it was found that women have higher medians in social support, religion, focus on emotions and venting, and positive reinterpretation. In contrast, men had higher medians of humor, alcohol-drug use, and planning and active coping. These results are similar to those reported by Carver et al. (1989), Eisenbarth (2019), and Makarowski et al. (2020), and can be explained according to Sica et al. (2008), who stated that gender-related differences in the adoption of coping strategies could be attributed to differences in the stressful situations that are faced: as a matter of fact, women usually face more stressful circumstances associated with family care and health, while men deal with situations more related to work and financial difficulties.

In regard to age groups, no differences were reported in social support and humor, but it was found that people aged 15 to 44 had lower medians in religion, planning, and positive reinterpretation, but higher medians in alcohol-drug use and focus on emotions and venting. This is consistent with previous research demonstrating that young people tend to use less active coping strategies than adults (Sica et al., 2008). Regarding the educational and occupation level, no differences were reported in terms of alcohol-drug use. The low education groups and the students had lower medians in social support, religion, humor, planning, and positive reinterpretation, but presented higher medians in focus on emotions and venting. Finally, in regard to people living with their family during lockdown compared to those living alone or with roommates, differences were

reported only in terms of turning to religion (with higher medians in those living with family) and drug or alcohol consumption (with higher medians in those living alone or with roommates).

There is not much literature explaining these results (Sica et al., 2008). However, it may be hypothesized that, in addition to the educational and occupation level, the use of some strategies may be ascribable to age and to the most used strategies in each group. Furthermore, these results are similar to the ones reported by Pieh et al. (2020) and Prati (2021) showing that adults under 35 years of age, women, unemployed people, people living alone, and people with low income present the most severe mental health problems. Nevertheless, in order to understand all the results described above, it is also important to recognize that differences in sociodemographic characteristics, even within the same country, can be explained considering that people may have multiple cultural identities or may identify themselves with their ethnic, professional/occupational, or religious culture, rather than with their national culture. Moreover, foreign cultural aspects may be adopted due to globalization, mass media, and social networks (Guan et al., 2020).

Regarding the association between perceived stress and coping strategies, Lazarus and Folkman (1986) proposed that there are two general types of coping with stress: the first, termed problem-focused, is aimed at doing something to solve the situation or modify the stress, whereas the second, the emotion-focused, is aimed at reducing the emotional distress. However, this does not mean that they are positive or negative types. People sometimes use adaptive or non-adaptive strategies, and this may be linked to the fact that reactions to the same stimulus are different and may vary depending on circumstances (Lazarus, 2000). Additionally, coping styles correspond to an individual predisposition to face situations with the use of either one or the other strategy. Instead, coping strategies are specific processes used according to the context and therefore can change depending on the situation (Cheng et al., 2014; Garrido-Hernansaiz et al., 2020).

In the present study, we found associations between perceived stress and coping strategies, but the finding that only social support does not present a statistically significant correlation with stress can be explained by the fact that, during a stressful event, the perception of a lack of social support could be only a small part of the negative consequences of it, while other personal coping resources can reduce its negative impact (Popa et al., 2014). On the other hand, the other coping strategies were significantly related to perceived stress, although

these correlations were weak or moderate. According to Carver et al. (1989) this is because people facing stressful experiences can deploy various coping strategies that may be theoretically considered mutually exclusive, and at a pragmatic level may operate independently depending on situation, context, timing, etc. (i.e., coping flexibility; Cheng, 2001), as found in our GLM. Here, the most functional model to predict perceived stress during lockdown included different coping strategies that should not be dichotomously considered, but rather be interpreted according to the function they fulfill when used in a specific situation.

Given that coping responses try to alleviate the stressful situation (Folkman & Lazarus, 1985), some reactions are more functional than others, such as the ones found in the present study and aimed at directly facing the problem (planning and active coping, and positive reinterpretation). In contrast, those trying to mitigate the discomfort (drug or alcohol use and focus on emotions and venting), that may be better for well-being in the short term - for example during the lockdown - although they are only fulfilling a merely palliative function without modifying the source of stress (Carver et al., 1989), in the long term, they can affect quality of life, psychological well-being, and mental health, since it has been found that people who make more use of avoidant strategies and who are focused on emotional distress tend to present more maladjustment (Sica et al., 2008; Prati, 2021).

The present study has some limitations that must be taken into account when interpreting results. At methodological level, the type of snowball sampling, the small and very different sample size in each country does not allow to reach a representativeness for all the participating countries. The majority of participants were young people, women, university students, and workers, which makes it difficult to generalize findings and apply them to populations who are socioeconomically less favored or show other aspects of vulnerability. Regarding the reliability of the instruments used to measure the variables, Cronbach's alpha as a coefficient of internal consistency in Likert-type scales with less than five response categories establishes non-optimal levels of reliability (Elosua-Oliden & Zumbo, 2008), as was the case of the COPE scale, which has four response options, and as observed in the present study, several subscales presented low coefficients in the three different language versions and in the total sample, and even in the original version in English reported in Table 1. As this is a cross-sectional and correlational study, causality cannot be inferred. Therefore, longitudinal studies are required to assess the evolution of mental health not only during

lockdown, but also afterwards, in order to uncover the consequences from a psychosocial viewpoint. In addition to the previously mentioned methodological limitations, because of the complexity of the pandemic worldwide and in each single country, and all its implications, there are many covariates not included in the present study that may affect the results. These are, for instance, the differences in each country in terms of containment measures, restrictions, laws and sanctions, government and health authorities' management of the situation, type of information disseminated by media, resources available for diagnoses, treatments and aid, number of infections and deaths, job and economic losses, etc. These elements may significantly have affected the perceived stress and coping mechanisms, and the findings of the present study. When analyzing the differences in perceived stress and coping strategies between the countries and depending on sociodemographic characteristics found in the present study, it must be borne in mind that the evaluation of these variables was done at individual and not collective level. Therefore, although an attempt was made to group the results and to interpret them using general theoretical models, individual differences should not be lost sight of, especially when proposing prevention or intervention plans.

The results of the present research, which corroborate previous studies, may contribute to the understanding of stress reactions of people across different countries, according to sociodemographic characteristics such as age, sex, educational level, occupation, and people living with them during lockdown. Moreover, results may help to identify the urgency of monitoring mental health in vulnerable groups such as youth, students, and women, in order to design specific prevention and intervention programs (Andrades-Tobar et al., 2021; Riquelme-Lobos & Raipán-Gómez, 2021).

### Conflicts of interest

The authors have no conflicts of interest to declare.

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