

Artículo Científico

# Prevalence and factors associated with anxiety and depression symptoms in adults from Chihuahua City, Mexico during COVID-19 pandemic and lockdown measures

Prevalencia y factores asociados a síntomas de ansiedad y depresión en adultos de la ciudad de Chihuahua, México durante la pandemia COVID-19 y las medidas de aislamiento

María Fernanda Guerrero-Lara<sup>1</sup>, Sandra Alicia Reza-López<sup>2</sup>, Luis Eduardo Juárez-Nogueira<sup>3</sup>, Alva Rocío Castillo-González<sup>4</sup>, Carlos Arzate-Quintana<sup>4</sup>, Geovanni Alexis Gómez-Ortega<sup>1</sup>, María Isabel Saad-Manzanera<sup>1</sup> & María Alejandra Favila-Pérez<sup>4\*</sup>

<sup>1</sup> Investigation Department, Autonomous University of Chihuahua. Faculty of Medicine and Biomedical Sciences. Circuito Universitario Campus II. Chihuahua, Chih., México. C. P. 31109.

<sup>2</sup> Embryology Laboratory, Autonomous University of Chihuahua. Faculty of Medicine and Biomedical Sciences. Circuito Universitario Campus II. Chihuahua, Chih., México. C. P. 31109.

<sup>3</sup> Psychiatric Hospital Doctor Ignacio González Estavillo. Av. Zootecnia No. 13201, Col. Zootecnia, Chihuahua, Chih., México. C.P. 31253.

<sup>4</sup> Microbiology and Parasitology Department, Autonomous University of Chihuahua. Faculty of Medicine and Biomedical Sciences. Circuito Universitario Campus II. Chihuahua, Chih., México. C. P. 31109.

\*Correspondencia: [afavila@uach.mx](mailto:afavila@uach.mx) (María Alejandra Favila Pérez)

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## Abstract

*Introduction:* Worldwide, during the coronavirus disease (COVID-19) pandemic, cases of anxiety and depression increased among the population. *Objective:* To determine the prevalence of anxiety and depression symptoms and identify their associated factors, including lockdown measures in the population over 18 years from Chihuahua, Chihuahua, Mexico, during the COVID-19 pandemic. *Method:* Cross-sectional study, with an online survey and snowball sampling. The GAD-7 (anxiety), PHQ-9 (depression) and Social Distancing Likert-type scales were used. Frequencies, measures of central tendency, and dispersion were calculated; bivariate analyses were performed with prevalence odds ratio as a measure of association between those with the presence and absence of anxiety and depression symptoms; for the total of the sample and stratifying by sex, calculating the

degree of association between the categorical variables using Fisher's exact test and Chi<sup>2</sup>, considering a  $p < .05$ . *Results*: From 377 participants, 46 % had anxiety symptoms and 43 % had depressive symptoms. Being a woman, single, young (<50 years), student, not exercising, smoking, consuming alcohol, practicing social distancing measures, a history of a previous mental disorder or mental health care, were associated with symptoms of anxiety and depression. *Discussion and conclusion*: High prevalence of anxiety and depression symptoms were found, justifying a follow-up of the population's mental health.

**Keywords:** COVID-19, SARS-CoV-2, mental health, quarantine, social distancing.

## Resumen

*Introducción*: A nivel mundial, durante la pandemia por la enfermedad por coronavirus (COVID-19) aumentaron los casos de ansiedad y depresión entre la población. *Objetivo*: Determinar la prevalencia de síntomas de ansiedad y depresión e identificar sus factores asociados incluyendo las medidas de aislamiento en población adulta de Chihuahua, Chihuahua, México durante la pandemia COVID-19. *Método*: Estudio transversal con encuesta en línea y muestreo en bola de nieve. Se emplearon las escalas GAD-7 (ansiedad), PHQ-9 (depresión) y de distanciamiento social tipo Likert. Se calcularon frecuencias, medidas de tendencia central y dispersión; se realizaron análisis bivariados con razón de momios de prevalencias como medida de asociación entre aquellos con presencia y ausencia de síntomas de ansiedad y depresión para el total de la muestra y estratificado por sexo, calculando el grado de asociación entre las variables categóricas mediante la prueba exacta de Fisher y Chi<sup>2</sup>, considerando una  $p < .05$ . *Resultados*: De 377 participantes, 46 % presentaron síntomas de ansiedad y 43 % síntomas depresivos. Ser mujer, soltero(a), joven (<50 años), estudiante, no realizar ejercicio, el tabaquismo, consumo de alcohol, practicar las medidas de distanciamiento social, el antecedente de un trastorno mental previo y de atención de salud mental, estuvieron asociados con la presencia de síntomas de ansiedad y/o depresión. *Discusión y conclusión*: Se encontraron prevalencias elevadas de síntomas de ansiedad y depresión, justificando un seguimiento de la salud mental de la población.

**Palabras clave:** COVID-19, SARS-CoV-2, salud mental, cuarentena, distanciamiento social.

## 1. Introduction

Since SARS-CoV-2 is a highly contagious virus, social distancing and quarantine measures were adopted; although they have been essential strategies to reduce the infection rate, the World Health Organization (WHO) recognizes that they may be linked to negative effects on mental health (WHO, 2020).

During the first two weeks of quarantine in Wuhan, China, depression, and anxiety in adults were reported in 26.47 % and 70.78 % respectively; the prevalence was significantly higher among quarantined subjects (Tang *et al.*, 2020). Similar results were obtained in adults in Italy (Rossi *et al.*, 2020), the United States (Marroquín *et al.*, 2020) and Mexico (Galindo-Vázquez *et al.*, 2020): quarantine and social distancing were independently associated with more severe symptoms of depression and anxiety, and the prevalence of these symptoms were even higher than in other pandemics. Contrary to the results in a Mexico City study, where the presence of depressive

symptoms and general anxiety were associated with non-adherence to public health directives. In addition, economic difficulties were associated with poor mental health (Flores-Torres *et al.*, 2021). An interesting scenario that has been described in a Mexican population sample is where those who had symptoms of depression before social isolation reported the disappearance of depressive symptoms due to the effect of social isolation. It is worth mentioning that during the lockdown measures, in this same study, 4.29 % increased their tobacco consumption, and the highest percentage (18.18 %) of increase in alcohol level consumption was in individuals who drank alcoholic beverages to the point of losing consciousness before social isolation (Genis-Mendoza *et al.*, 2021). Furthermore, in other Mexican sample during the period from May to June 2020, reported that, throughout their lives, 58.8 % of the population had received some type of mental health care, and the most prevalent pathologies found were depression and anxiety (Rodríguez-Hernández *et al.*, 2021).

Chihuahua was the first state in Mexico to return to red traffic light (monitoring system for epidemiological risk of COVID-19) in October 2020, causing stricter implementation of measures to prevent the transmission of the virus (Gobierno del Estado de Chihuahua, 2020). In addition, Chihuahua is third place nationwide in depression (Dirección General de Epidemiología de la Secretaría de Salud [DGE], 2021), and has the highest suicide rate by state (Instituto Nacional de Estadística y Geografía [INEGI], 2019). Therefore, these COVID-19 preventive measures, in addition to causing a possible increase in the prevalence of psychiatric disorders such as depression, it could raise suicide rates in the same way.

This highlights the need to assess mental health in the population. However, to date, there are no studies (to our knowledge) where the mental health of the general population of Chihuahua has been investigated, associated with the pandemic, social distancing measures and quarantine. Therefore, the objective of this study was to determine the prevalence of symptoms of anxiety, depression and their associated factors in the population over 18 years from Chihuahua, Chihuahua, Mexico, one year after the implementation of social distancing measures and quarantine for the COVID-19; which were applied by the federal government of Mexico on March 23, 2020 (Suárez *et al.*, 2020).

## **2. Materials and Methods**

### **2.1. Design of the study**

An observational study was conducted with a cross-sectional design using an online survey.

### **2.2. Subjects**

People over 18 who could read and write, and those who were residents of the city of Chihuahua during the COVID-19 pandemic, were included. Those who did not wish to participate were excluded; and the surveys of those who during or after filling it out decided not to continue participating or had missing data were eliminated. We had a total of  $n = 377$  participants, however

because of the web-based design, no response rate could be estimated, as it was not possible to estimate how many persons were reached. The sampling method used was non probabilistic.

### 2.3. Procedures

The data was collected with a Google Forms online survey, with snowball sampling from February 11 to March 11, 2021. The survey was first distributed to college students from the Autonomous University of Chihuahua via social networks (WhatsApp, Email, Facebook, and Telegram) and they were encouraged to share it. When accessing the link, informed consent was included prior to the questionnaire, it indicated the purpose of the research, and assured that the information to be provided as confidential, anonymous and that the participant could withdraw at any time. In addition, an email was provided for those who had questions before or after filling in the survey.

The questionnaire consisted of 39 items divided into six sections: 1. Sociodemographic and general data (age, sex, marital status, household, employment status, chronic diseases, smoking and alcohol consumption [these last two factors were also asked to determine whether there was any increase in the consumption of such substances since the implementation of the COVID-19 restrictive measures]); 2. Quarantine and social distancing (with quarantine / without quarantine, social distancing Likert-type scale, isolation time); 3. Mental health (previous mental disorder, previous mental health care); 4. Scale for symptoms of depressive disorders (PHQ-9); 5. Scale for general anxiety disorder (GAD-7); and 6. Other factors (social support, use of telecommunications, financial concerns, frequency of exposure to information about COVID-19, home office and online classes, physical exercise, loss of a loved one [Appendix 1]). The questionnaire had an average duration of 10 minutes and could be done at any time within the established days. The data was collected automatically by the same Google Forms online survey collector via Excel Microsoft Office.

### 2.4. Measurements

The following evaluation tools were used:

a) *Patient Health Questionnaire (PHQ-9)* (Kroenke et al., 2001): an instrument with nine items, where the response is evaluated on a scale from 0 to 3, being 0 "not at all", 1 "several days", 2 "more than half the days" and 3 "nearly every day". It evaluates the possible presence of major depressive disorder and the severity of depression symptoms. They were validated in the Mexican population (Familiar et al., 2015). Symptom severity classification was used with the values established by the scale authors, where 0-4 points are minimal, 5-9 mild, 10-14 moderate, 15-19 moderately severe and 20-27 severe. In addition, the cut-off point  $\geq 10$  was used to consider the presence of depressive symptoms (Kroenke et al., 2001). In our sample, the Cronbach's alpha was  $\alpha = 0.89$

b) *Generalized Anxiety Disorder (GAD-7)* (Spitzer et al., 2006): a seven items questionnaire, where the response is evaluated with the same 0 - 3 scale mentioned above. It assesses the presence of possible generalized anxiety disorder. Validated in Mexican population (Castro Silva et al., 2016). Symptom severity classification was used with the values established by the scale authors, where 0-

4 points are minimal, 5-9 mild, 10-14 moderate and 15-21 severe. In addition, the cut-off point  $\geq 10$  was used to consider the presence of anxiety symptoms (Spitzer *et al.*, 2006). In our sample, the internal consistency was  $\alpha = 0.91$

c) *Social Distancing Likert-type scale*: the actions evaluated were: 1. Staying at least 1.5 meters away from other people. 2. Work from home (online classes or home office). 3. Avoid greeting someone by shaking hands, hugging or kissing. 4. Not attending social gatherings or conglomerate sites. These measures were assessed on a five point scale, in which 0 means "I do not follow the recommendation at all", 1 "I follow the recommendation some of the time", 2 "less than half the time", 3 "more than half the time", 4 "most of the time" and 5, "I follow the recommendation all the time"; to gather information about how individuals practiced social distancing measures until the moment of the survey. A cut-off point of  $\geq 14$  was used to consider participants who fully complied with the measures (Galindo-Vázquez *et al.*, 2020), reaching an internal consistency of  $\alpha = 0.77$

d) The participants who were considered in quarantine were those who claimed to remain at home and avoided social contact, only going out for what was strictly necessary during the pandemic (for the acquisition of essential supplies, in case of the need for medical care or emergencies); this, according to the regulations of agreement No. 049/2020 of the official newspaper of the Government of the State of Chihuahua, March 25, 2020 (Gobierno del Estado de Chihuahua, 2020).

## 2.5. Statistical analyses

A minimum sample size of 306 participants was calculated, with an expected baseline frequency of 27.5 % based on the prevalence obtained in previous studies (Galindo-Vázquez *et al.*, 2020), and a 95 % confidence level, using the CDC's STATCALC application, EPI-INFO.

An exploratory analysis was performed; the Kolmogorov-Smirnov goodness-of-fit test was applied to verify the normal distribution of the variables measured on a ratio scale. Measures of central tendency and dispersion were obtained for the age. The prevalence of anxiety and depression symptoms was calculated. Pearson's Chi-square and Fisher's exact test were used to identify the association between the independent (IV) and dependent variables (DV). The DV was the presence or absence of symptoms of anxiety and depression; the IV were those in which statistically significant differences ( $p < .05$ ) were found: age, sex, marital status, employment status, comorbidities, use of telecommunications, financial concerns, home office, online classes, physical exercise, social distancing measures and quarantine. Prevalence Odds Ratio (POR) was calculated for each variable with a 95 % confidence interval (95 % CI). Additionally, a bivariate analysis stratified by sex was performed with the same procedure. Finally, Spearman's correlation was used to determine the linear relationship between anxiety and depression scores. Data was analyzed in SPSS V25.0, with statistical significance established at  $p < .05$ .

## 2.6 Ethical considerations

The present study was reviewed and approved by the Research Ethics Committee of the Faculty of Medicine and Biomedical Sciences of the Autonomous University of Chihuahua in February 2021

(CI-040-20). Informed consent was obtained prior to data collection, where the confidentiality and anonymity of the information was ensured. The ethical principles for medical research involving human subjects established in the Declaration of Helsinki were followed (World Medical Association, 2013).

### 3. Results and Discussion

A total of 416 individuals participated, of which 39 were excluded. The final sample consisted of 377 participants, of whom 262 were women and 115 men, with an age range of 18 to 83 years (Median [Me] = 25, Interquartile Range [IQR] = 14). The sociodemographic characteristics are shown in Table 1.

**Table 1.** Sociodemographic characteristics from the study population (n = 377)

**Tabla 1.** Características sociodemográficas de la población de estudio (n = 377)

<b>Characteristic</b>	<b>n (%)</b>
<b>Age</b>	
≤ 22 years	66 (18)
23-25 years	156 (41)
26-30 years	39 (10)
31-49 years	51 (14)
≥ 50 years	65 (17)
<b>Sex</b>	
Woman	262 (69)
Men	115 (31)
<b>Marital status</b>	
Single	262 (69)
Divorced or separated	16 (4)
Widow	7 (2)
Consensual union	6 (2)
Married	86 (23)
<b>Household</b>	
Living alone	21 (6)
Living with someone	356 (94)
<b>Employment status</b>	
Student	105 (28)
Health professional	85 (23)
Employee from other areas	139 (37)
Unemployed	17 (5)

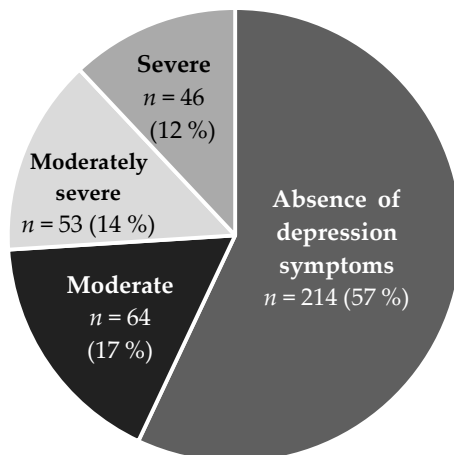
Retired	10 (3)
Pensioner	4 (1)
Housekeeper	17 (5)
<b>Comorbidities</b>	
Presence of chronic diseases	75 (120)
Absence of chronic diseases	302 (80)
Smokers	52 (14)
Non-smokers	325 (86)
Alcohol consumption	242 (64)
No alcohol consumption	135 (36)
Presence of previous mental disorder	143 (38)
Absence of previous mental disorder	234 (62)
Prior mental health care	174 (46)
Absence of prior mental health care	203 (54)

Depressive and anxiety symptoms prevalence are shown in Figures 1 and 2, respectively.

A prevalence of 12 % (n = 44) of participants with only anxiety symptoms was found, followed by 9 % (n = 35) for those with depressive symptoms only, and a 34 % (n = 128) prevalence for those with symptoms of anxiety and depression altogether. A strong positive correlation (Spearman's  $\rho = .77$ ,  $p < .001$ ) was identified between the scores of the depression and anxiety scales.

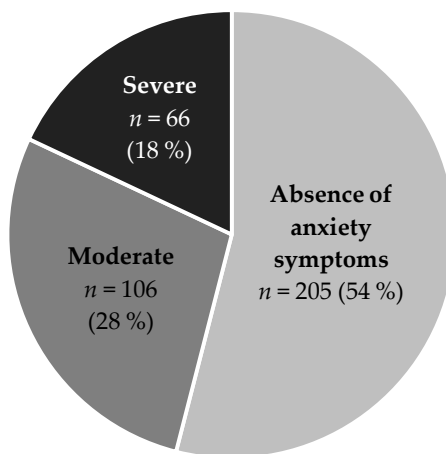
For the female sex (n = 262), a prevalence of 53 % (n = 138) and 48 % (n = 127) was identified for anxiety ( $p < .001$ ) and depression symptoms ( $p .001$ ), respectively; while in men (n = 115) these prevalences were 30 % (n = 34) and 31 % (n = 36). Furthermore, being a woman was identified as a factor associated with a higher frequency of both anxiety (POR 2.65 [95 % CI 1.66-4.23]  $p < .001$ ) and depression symptoms (POR 2.06 [95 % CI 1.3-3.27]  $p .001$ ).

Among the 64 % (n = 241) quarantined subjects from the sample, 43 % (n = 104) had anxiety symptoms and 41 % (n = 98) of depression. On the other hand, of the individuals who frequently practiced the social distancing measures (73 %, n = 274), 45 % (n = 124) exhibited depressive and 49 % (n = 134) anxiety symptoms. No association was found between the quarantine group and the presence of symptoms; while those who frequently practiced the social distancing measures were associated with a higher frequency of anxiety symptoms (POR 1.63 [95 % CI 1.02-2.60]  $p .03$ ), compared to those who partially complied them.



**Figure 1.** Prevalence of depressive symptoms in the ≥ 18-year-old population of Chihuahua, Chihuahua during the COVID-19 pandemic.

**Figura 1.** Prevalencia de síntomas depresivos en personas ≥ 18 años de edad en la ciudad de Chihuahua, Chihuahua durante la pandemia de COVID-19.



**Figure 2.** Prevalence of anxiety symptoms in the ≥ 18-year-old population of Chihuahua, Chihuahua during the COVID-19 pandemic.

**Figura 2.** Prevalencia de síntomas de ansiedad en personas ≥ 18 años de edad en la ciudad de Chihuahua, Chihuahua durante la pandemia de COVID-19.

The results of the bivariate analyses illustrating the factors associated with a higher frequency of anxiety and depression symptoms in our population sample are shown in Table 2. The bivariate analyses stratified by sex are presented in Table 3.



**Table 2.** Bivariate analyses of factors associated with symptoms of anxiety and depression in the  $\geq 18$ -year-old population of Chihuahua, Chihuahua ( $n = 377$ ).**Tabla 2.** Análisis bivariados de factores asociados a síntomas de ansiedad y depresión en la población  $\geq 18$  años de Chihuahua, Chihuahua ( $n = 377$ ).

	<b>Presence of anxiety symptoms</b> <i>n</i> = 172 (46 %)	<b>Absence of anxiety symptoms</b> <i>n</i> = 205 (54 %)	<i>POR</i> (95 % <i>CI</i> )	<i>p</i>	<b>Presence of depression symptoms</b> <i>n</i> = 163 (43 %)	<b>Absence of depression symptoms</b> <i>n</i> = 214 (57 %)	<i>POR</i> (95 % <i>CI</i> )	<i>p</i>
<b>Age</b>								
$\leq 22$ years	41 (62 %)	25 (38 %)	7.24 (3.25-16.12)	< .001	43 (65 %)	23 (35 %)	9.17 (4.03-20.89)	< .001
23-25 years	73 (47 %)	83 (53 %)	3.88 (1.92-7.83)	< .001	70 (45 %)	86 (55 %)	3.99 (1.94-8.21)	< .001
26-30 years	18 (46 %)	21 (54 %)	3.78 (1.55-9.20)	0.002	19 (49 %)	20 (51 %)	4.66 (1.89-11.50)	< .001
31-49 years	28 (55 %)	23 (45 %)	5.37 (2.33-12.39)	< .001	20 (39 %)	31 (61 %)	3.16 (1.34-7.47)	0.007
$\geq 50$ years	12 (18 %)	53 (82 %)	(Ref.)	-	11 (17 %)	54 (83 %)	(Ref.)	-
<b>Marital status</b>								
Single	130 (50 %)	132 (50 %)	2.04 (1.22-3.40)	0.005	131 (50 %)	131 (50 %)	3.09 (1.78-5.35)	< .001
Divorced or separated	8 (50 %)	8 (50 %)	2.07 (0.70-6.09)	0.18	6 (37 %)	10 (63 %)	1.85 (0.60-5.72)	0.27
Widow	2 (29 %)	5 (71 %)	0.82 (0.15-4.53)	1	2 (29 %)	5 (71 %)	1.23 (0.22-6.85)	1
Consensual union	4 (67 %)	2 (33 %)	4.14 (0.71-23.99)	0.17	3 (50 %)	3 (50 %)	3.09 (0.58-16.51)	0.18
Married	28 (33 %)	58 (67 %)	(Ref.)	-	21 (24 %)	65 (76 %)	(Ref.)	-
<b>Employment status</b>								
Student	55 (52 %)	50 (48 %)	1.67 (0.83 - 3.36)	0.14	59 (56 %)	46 (44 %)	3.84 (1.80 - 8.21)	< .001
Health professional	35 (41 %)	50 (59 %)	1.06 (0.51 - 2.19)	0.85	39 (46 %)	46 (54 %)	2.54 (1.16 - 5.55)	0.017
Employee from other areas	63 (45 %)	76 (55 %)	1.26 (0.64 - 2.46)	0.48	53 (38 %)	86 (62 %)	1.84 (0.88 - 3.86)	0.01
Currently not working*	19 (40 %)	29 (60 %)	(Ref.)	-	12 (25 %)	36 (75 %)	(Ref.)	-

<b>Comorbidities</b>								
Presence of chronic diseases	27 (36 %)	48 (64 %)	0.60 (0.36 – 1.02)	0.06	27 (36 %)	48 (64 %)	0.68 (0.40 – 1.15)	0.15
Absence of chronic diseases	145 (48 %)	157 (52 %)	(Ref.)	-	136 (45 %)	166 (55 %)	(Ref.)	-
Smokers	29 (56 %)	23 (44 %)	1.60 (0.89-2.89)	0.11	36 (69 %)	16 (31 %)	3.50 (1.86-6.58)	< .001
Non-smokers	143 (44 %)	182 (56 %)	(Ref.)	-	127 (39 %)	198 (61 %)	(Ref.)	-
Alcohol consumption	119 (49 %)	123 (51 %)	1.49 (0.97-2.29)	0.06	120 (50 %)	122 (50 %)	2.10 (1.35-3.27)	0.001
No alcohol consumption	53 (39 %)	82 (61 %)	(Ref.)	-	43 (32 %)	92 (68 %)	(Ref.)	-
Presence of previous mental disorder	90 (63 %)	53 (37 %)	3.14 (2.04-4.85)	< .001	88 (62 %)	55 (38 %)	3.39 (2.19-5.23)	< .001
Absence of previous mental disorder	82 (35 %)	152 (65 %)	(Ref.)	-	75 (32 %)	159 (68 %)	(Ref.)	-
Prior mental health care	96 (55 %)	78 (45 %)	2.05 (1.36-3.10)	< .001	99 (57 %)	75 (43 %)	2.86 (1.88-4.37)	< .001
Absence of prior mental health care	76 (37 %)	127 (63 %)	(Ref.)	-	64 (32 %)	139 (68 %)	(Ref.)	-
<b>Use of telecommunications</b>								
Always	70 (48 %)	77 (52 %)	0.57 (0.28-1.13)	0.1	63 (43 %)	84 (57 %)	0.57 (0.28-1.12)	0.1
Occasionally	75 (40 %)	111 (60 %)	0.42 (0.21-0.83)	0.01	75 (40 %)	111 (60 %)	0.51 (0.26-0.99)	0.04
Rarely	27 (61 %)	17 (39 %)	(Ref.)	-	25 (57 %)	19 (43 %)	(Ref.)	-
<b>Financial concerns</b>								
Always	24 (49 %)	25 (51 %)	0.90 (0.47-1.73)	0.76	22 (45 %)	27 (55 %)	0.94 (0.48-1.81)	0.85
Occasionally	77 (40 %)	113 (60 %)	0.64 (0.41-1.00)	0.04	77 (40 %)	113 (60 %)	0.78 (0.50-1.22)	0.29
Rarely	71 (51 %)	67 (49 %)	(Ref.)	-	64 (46 %)	74 (54 %)	(Ref.)	-
<b>Home office and online classes</b>								
Rarely	27 (31 %)	61 (69 %)	0.44 (0.26-0.75)	0.003	31 (36 %)	56 (64 %)	0.66 (0.40-1.12)	0.12
Occasionally	42 (54 %)	36 (46 %)	1.21 (0.72-2.03)	0.44	36 (46 %)	42 (54 %)	1.03 (0.61-1.74)	0.89
Frequently	103 (27 %)	108 (29 %)	(Ref.)	-	96 (25 %)	116 (31 %)	(Ref.)	-

<b>Physical exercise</b>								
Never	62 (54 %)	52 (46 %)	1.90 (1.06-3.37)	0.02	55 (48 %)	59 (52 %)	1.70 (0.77-3.77)	0.18
1 day per week	20 (38 %)	32 (62 %)	0.99 (0.48-2.03)	0.99	21 (40 %)	31 (60 %)	1.24 (0.50-3.04)	0.63
2 - 3 days per week	42 (45 %)	52 (55 %)	1.28 (0.70-2.34)	0.4	43 (46 %)	51 (54 %)	1.54 (0.68-3.48)	0.29
4 - 5 days per week	32 (39 %)	51 (61 %)	(Ref.)	-	32 (39 %)	51 (61 %)	1.15 (0.50-2.64)	0.74
6 - 7 days per week	16 (47 %)	18 (53 %)	1.41 (0.63-3.17)	0.39	12 (35 %)	22 (65 %)	(Ref.)	-
<b>Quarantine</b>								
Present	104 (43 %)	137 (57 %)	0.75 (0.49-1.15)	0.2	98 (41 %)	143 (59 %)	0.74 (0.49-1.14)	0.18
Absent	68 (50 %)	68 (50 %)	(Ref.)	-	65 (48 %)	71 (52 %)	(Ref.)	-
<b>Social distancing measures</b>								
Always complies them	134 (49 %)	140 (51 %)	1.63 (1.02 -2.60)	0.03	124 (45 %)	150 (55 %)	1.35 (0.85-2.15)	0.19
Partially complies them	38 (37 %)	65 (63 %)	(Ref.)	-	39 (38 %)	64 (62 %)	(Ref.)	-

POR, prevalence odds ratio; 95 % CI, 95 % confidence interval, \* It includes the unemployed, retired, pensioner, and housekeeper categories.

**Table 3.** Bivariate analyses of factors associated with depression and anxiety symptoms stratified by sex, in the  $\geq 18$ -year-old population of Chihuahua, Chihuahua ( $n = 377$ ).**Tabla 3.** Análisis bivariados de factores asociados a síntomas de depresión y ansiedad estratificado por sexo, de la población  $\geq 18$  años de Chihuahua, Chihuahua ( $n = 377$ ).

	Women ( $n = 262$ )				Men ( $n = 115$ )			
	Depression symptoms POR (95 % CI)	$p$	Anxiety symptoms POR (95 % CI)	$p$	Depression symptoms POR (95 % CI)	$p$	Anxiety symptoms POR (95 % CI)	$p$
<b>Age</b>								
$\leq 22$ years	14.72 (4.68 - 46.30)	<0.0001	9.08 (3.28 - 25.08)	< 0.0001	4.90 (1.45 - 16.55)	0.008	5.71 (1.34 - 24.33)	0.02
23-25 years	7.32 (2.66 - 20.07)	<0.0001	3.83 (1.66 - 8.80)	0.001	1.01 (0.31 - 3.28)	0.97	2.66 (0.65 - 10.78)	0.21
26-30 years	8.25 (2.46 - 27.63)	0.0003	2.99 (1.03 - 8.65)	0.04	1.75 (0.38 - 7.87)	0.69	5.71 (1.08 - 30.07)	0.07
31-49 years	5.10 (1.64 - 15.84)	0.003	4.16 (1.56 - 11.10)	0.003	1.16 (0.23 - 5.72)	1	8.0 (1.53 - 41.63)	0.01
$\geq 50$ years	(Ref.)	-	(Ref.)	-	(Ref.)	-	(Ref.)	-
<b>Marital status</b>								
Single	2.63 (1.40 - 4.94)	0.002	1.92 (1.05 - 3.51)	0.03	5.41 (1.50 - 19.46)	0.004	2.40 (0.82 - 7.01)	0.1
Divorced or separated	1.35 (0.38 - 4.72)	0.63	1.72 (0.51 - 5.79)	0.37	4.33 (0.29 - 63.29)	0.33	2.40 (0.18 - 31.88)	0.47
Widow	0.72 (0.07 - 7.43)	1	0.49 (0.04 - 5.03)	1	4.33 (0.29 - 63.29)	0.33	2.40 (0.18 - 31.88)	0.47
Consensual union	2.16 (0.28 - 16.63)	0.59	4.43 (0.43 - 45.31)	0.3	8.66 (0.42 - 177.32)	0.24	4.80 (0.25 - 90.30)	0.35
Married	(Ref.)	-	(Ref.)	-	(Ref.)	-	(Ref.)	-
<b>Employment status</b>								
Student	7.26 (2.89 - 18.22)	<0.0001	3.28 (1.46 - 7.39)	0.003	0.40 (0.06 - 2.49)	0.4	0.24 (0.03 - 1.48)	0.17
Health professional	4.64 (1.87 - 11.51)	0.0006	1.37 (0.62 - 3.04)	0.43	0.14 (0.01 - 1.08)	0.12	0.25 (0.03 - 1.77)	0.19
Employee from other areas	4.06 (1.69 to 9.75)	0.001	2.60 (1.21 - 5.56)	0.01	0.12 (0.01 - 0.76)	0.02	0.13 (0.02 - 0.85)	0.03
Currently not working*	(Ref.)	-	(Ref.)	-	(Ref.)	-	(Ref.)	-

<b>Comorbidities</b>								
Presence of chronic diseases	0.45 (0.24 - 0.85)	0.01	0.44 (0.24 – 0.83)	0.009	1.86 (0.70 – 4.92)	0.2	1.24 (0.45 – 3.41)	0.67
Absence of chronic diseases	(Ref.)	-	(Ref.)	-	(Ref.)	-	(Ref.)	-
Smokers	4.32 (1.96 - 9.54)	0.0001	1.52 (0.76 – 3.06)	0.22	2.05 (0.63 – 6.63)	0.22	1.57 (0.47 – 5.20)	0.45
Non-smokers	(Ref.)	-	(Ref.)	-	(Ref.)	-	(Ref.)	-
Alcohol consumption	2.41 (1.44 – 4.03)	0.0007	1.75 (1.06 – 2.90)	0.02	2.03 (0.78 – 5.25)	0.13	1.45 (0.57 – 3.64)	0.42
No alcohol consumption	(Ref.)	-	(Ref.)	-	(Ref.)	-	(Ref.)	-
Presence of previous mental disorder	2.79 (1.68 - 4.61)	<0.0001	2.63 (1.59 – 4.35)	0.0001	4.39 (1.71 – 11.27)	0.001	3.13 (1.23 – 7.97)	0.01
Absence of previous mental disorder	(Ref.)	-	(Ref.)	-	(Ref.)	-	(Ref.)	-
Prior mental health care	2.95 (1.78 – 4.90)	<0.0001	2.0 (1.22 – 3.28)	0.005	1.78 (0.76 – 4.19)	0.18	1.11 (0.46 – 2.70)	0.8
Absence of prior mental health care	(Ref.)	-	(Ref.)	-	(Ref.)	-	(Ref.)	-
<b>Use of telecommunications</b>								
Always	0.42 (0.17 – 1.02)	0.05	0.29 (0.11 – 0.79)	0.01	0.87 (0.25 – 3.03)	0.83	1.46 (0.40 – 5.35)	0.75
Occasionally	0.35 (0.14 – 0.83)	0.01	0.22 (0.08 – 0.58)	0.001	0.91 (0.27 – 3.10)	0.89	0.96 (0.26 – 3.51)	1
Rarely	(Ref.)	-	(Ref.)	-	(Ref.)	-	(Ref.)	-
<b>Home office and online classes</b>								
Rarely	0.85 (0.47 – 1.56)	0.61	0.44 (0.23 – 0.82)	0.009	0.42 (0.14 – 1.20)	0.1	0.57 (0.19 – 1.66)	0.3
Occasionally	1.65 (0.85 – 3.21)	0.13	1.75 (0.88 – 3.50)	0.1	0.53 (0.20 – 1.41)	0.2	1 (0.39 – 2.57)	0.99
Frequently	(Ref.)	-	(Ref.)	-	(Ref.)	-	(Ref.)	-

POR, prevalence odds ratio; 95 % CI, 95 % confidence interval, \* It includes the unemployed, retired, pensioner, and housekeeper categories.

In our sample, 14 % (n = 52) reported being smokers. Since the beginning of the pandemic, 5 % (n = 18) showed a decrease in smoking, 4 % (n = 15) remained the same and in another 5 % (n = 19) is increased. On the other hand, 64 % (n = 241) of the population claimed themselves to consume alcohol; of which, since the beginning of the pandemic, 26 % (n = 99) reported a decrease in consumption, in 23 % (n = 88) it remained the same and in 14 % (n = 54) is increased. In this sample, no association was found between the increase in these habits and being in quarantine or practicing social distancing.

Compared with previous studies carried out at the beginning of the quarantine in other states of Mexico, using the same self-assessment scales, the results of this study show a higher prevalence of symptoms of depression and anxiety. A study conducted in the State of Mexico in April 2020 during the COVID-19 pandemic (Toledo-Fernández *et al.*, 2020), reported that 6.7 % and 12.5 % of the sample met the scores for moderate-severe symptoms of depression (PHQ-9) and anxiety (GAD-7), respectively, values below those observed in the present study. There were minimal differences compared to national research, with a 20.8 % prevalence of severe anxiety symptoms and 27.5 % of moderately severe-severe depression symptoms. In addition, this study found a positive correlation between depression and anxiety scores, as in the present study (Galindo-Vázquez *et al.*, 2020).

According to the 2018-19 National Health and Nutrition Survey (ENSANUT), the prevalence of moderate to severe depressive symptoms in the adult population of the North of the country (including the state of Chihuahua) was 12.9 % (Cerecero-García *et al.*, 2020), showing a higher percentage in the present research; the same situation observed in the case of the presence of anxiety symptoms reported by the 2003 National Psychiatric Epidemiology Survey, which was 14.3 % (Medina-Mora *et al.*, 2003). Compared with pre-pandemic data, higher prevalence of depression was found. Nevertheless, this comparison should be taken with caution, due to the different evaluation methods used (self-report versus interview) and the sampling strategy. Besides, our research uses screening tools that suggest the presence of a mental disorder, but do not allow establishing a diagnosis.

The prevalence of depression and anxiety symptoms among quarantined respondents was lower than those who were not quarantined; and in our sample no association was found between quarantine and the presence of symptoms of any disorder, unlike the results found in other research studies (Marroquín *et al.*, 2020; Ozamiz-Etxebarria, *et al.*, 2020; Rossi *et al.*, 2020; Tang *et al.*, 2020). This outcome could be due to the fact that following health authorities' recommendations may have protective psychological effects by giving individuals confidence and a sense of control in prevention (Alkhamees *et al.*, 2020), and are consistent with the outcomes found in a study with a Mexican population sample, in which those who had symptoms of depression before social isolation, reported the disappearance of symptoms of depression due to the effect of social isolation (Genis-Mendoza *et al.*, 2021).

Respondents who consistently practiced social distancing measures reported a higher prevalence of anxiety symptoms than those who did not, and a significant association was observed between social distancing and anxiety; consistent results with other studies establishing this impact on mental health as a result of a decrease in social interactions, the perception of loneliness and the fear of being infected with COVID-19 (Marroquín *et al.*, 2020; Smith *et al.*, 2020; Wang *et al.*, 2020).

In our population sample of Chihuahua city, being a woman, single, young age (<50 years), not exercising, having a history of a previous mental disorder or mental health care, were factors associated with a higher frequency of anxiety symptoms. While the factors associated with the presence of depressive symptoms were: being a woman, young age (<50 years), single, being a student (this being the profession with the highest association), health professional or employee in another area compared to subjects who currently were not working, smoking, alcohol consumption, having a history of a previous mental disorder and mental health care. Results consistent with previous studies (Alkhamees *et al.*, 2020; Galindo-Vázquez *et al.*, 2020; Ozamiz-Etxebarria *et al.*, 2020; Rossi *et al.*, 2020; Schuch *et al.*, 2020).

Factors associated with a lower frequency of anxiety symptoms include not having a home office or online classes and occasional use of telecommunications to maintain social interaction with loved ones. The first has been shown in other published works as a factor of anxiety due to unsatisfactory work environments, such as internet problems or difficulties in following a schedule from home (Wang *et al.*, 2020). Online classes have also been established as a contributor to stress and anxiety because of increased academic difficulty due to the abrupt transition to virtual mode, followed by concerns about delayed graduation and grades (Wang *et al.*, 2020). Finally, the use of telecommunications has been described as a coping mechanism due to the support received by the community, family or friends through these media, while at the same time it decreases the perceived sense of loneliness (Palgi *et al.*, 2020; Smith & Lim, 2020; Wang *et al.*, 2020).

On the other hand, occasional financial concerns were also inversely associated with anxiety symptoms, unlike the results reported in previous studies where it is established as a risk factor due to the anxiety generated by the lack of work, being unemployed and the availability of finances in the future (Smith *et al.*, 2020; Tull *et al.*, 2020). These outcomes may be the consequence of a bias due to confounding variables not assessed, such as resilience. In addition, the survey, being a self-report instrument, depends on the subject's memory and interpretation, requiring a more objective financial assessment.

It is worth noting that women with chronic diseases were less likely to present symptoms of both disorders, contrary to what has been described in the literature, which shows that people with these diseases suffer higher levels of psychological symptoms due to a higher risk of infection by COVID-19 along with a worse prognosis (Galindo-Vázquez *et al.*, 2020; Ozamiz-Etxebarria *et al.*, 2020; Özdin & Bayrak Özdin, 2020). These outcomes may reflect a bias as a result of the sample, since the minority ( $n = 75$ ; 19 %) is the one with chronic diseases, requiring a larger sample of patients with this variable to reach precise conclusions, besides analyzing the impact these have on the quality of life of the participants.

Lastly, smoking increased in 5 % of the participants and decreased in another 5 %; expected results are that boredom and social distancing restrictions may have stimulated smoking, but the fear of contracting COVID-19 might have motivated others to decrease it (Bommelé *et al.*, 2020). The decrease in alcohol consumption was greater (26 %) than its increase (14 %), which may be due to the closure of establishments for its consumption. Therefore, the lower consumption may result from reduced access rather than a voluntary decision (Chodkiewicz *et al.*, 2020).

The present study has some limitations related to the sampling technique. Firstly, being a web-based survey with voluntary recruitment, it excludes people outside social networks, introducing a

selection bias, and secondly introducing a self-selection bias, as suggested by the highly unbalanced gender and age ratio observed (reason why it was decided to divide the sample with these specific age groups, so that the result could be analyzed with the lowest statistical self-selection bias). Also, given that the home office does not represent a voluntary decision, and since half of the Mexican population is working in an informal sector (workers that are not registered, regulated or protected by legal or regulatory frameworks), it is very likely that a significant proportion of the sample did not meet this factor because of this. Furthermore, the survey was based on self-report instruments, depending on the subject's memory or interpretation. For these reasons, the results presented should be interpreted with caution. However, these tools have been validated in the Mexican population with good results (Familiar *et al.*, 2015; Castro Silva *et al.*, 2016). It is necessary to mention the fact that the present study, by using a non-probabilistic sampling method, does not represent the general population of Chihuahua, which limits the external validity of the results.

## 4. Conclusions

This study is a first approach to the psychosocial aspect of the pandemic and its social distancing and quarantine measures in a population sample of Chihuahua, Chihuahua, where high prevalence of adverse mental health outcomes was found, and highlights the importance of monitoring the mental state of the population to improve preventive measures for the psychosocial effects of the pandemic. Those interventions that are already effective can benefit from targeting at-risk groups.

We hope the present study leads to the development of future studies in Chihuahua's México population to carry out a statistical surveillance of these psychiatric disorders throughout the pandemic. Longitudinal studies could be the next step to provide more information by having points of comparison along time; also, logistic regression analyses can provide more data by knowing through a predictive and explanatory model, the strength of association between the variables and the presence of anxiety and depression symptoms.

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## Conflicts of interest

All authors declare they have no conflicts of interest.

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**Appendix 1.** Other independent variables analyzed in the present study ( $n = 377$ )**Anexo 1.** Otras variables independientes analizadas en el presente estudio ( $n = 377$ )

	Variable	Categories	n (%)	
<b>Household</b>	Number of persons residing in the same dwelling at the time of filling out the survey.	Living alone	21 (6)	
		Living with someone	Living with 1 person	54 (14)
			Living with 2 people	89 (23)
			Living with 3 people	121 (32)
			Living with >3 people	92 (24)
<b>Chronic diseases</b>	Presence or absence of chronic degenerative diseases.	Absence of chronic diseases	302 (80)	
		Presence of chronic diseases	Hypertension	23
			Diabetes	9
			Heart diseases	3
			Cancer	2
			Asthma	28
			Others	29
<b>Smoking</b>	Status of tobacco smoking habit since the beginning of the COVID-19 pandemic.	Non-smokers	325 (86)	
		Smokers	Increased	19 (5)
			Decreased	18 (5)
			Remains the same	15 (4)
<b>Alcohol consumption</b>	Status of alcohol consumption since the start of the COVID-19 pandemic.	No alcohol consumption	135 (36)	
		Alcohol consumption	Increased	54 (14)
			Decreased	99 (26)
			Remains the same	88 (23)
<b>Previous mental disorder</b>	Diagnosis of any mental disorder, prior to the COVID-19 pandemic.	Absence of previous mental disorder	234 (62)	
		Presence of previous mental disorder	Anxiety	107
			Depression	72
			Other	20
<b>Previous mental health care</b>	Having received some type of mental health care (psychological or psychiatric) prior to the pandemic.	Absence of prior mental health care	203 (54)	
		Prior mental health care	174 (46)	
<b>Isolation time</b>	Time during which isolation measure (stay-at-home order) was practiced.	≥ 5 months	275 (73)	
		3-4 months	63 (17)	
		2 weeks to 2 months	23 (6)	
		Never	16 (4)	
<b>Social support</b>	Having someone you can lean on or with whom you can talk about your problems to cope psychological and social stressors.	Rarely	45 (12)	
		Occasionally	164 (44)	
		Always	168 (45)	
	Frequency of contact and communication with	Always	147 (39)	
		Occasionally	186 (49)	

<b>Use of telecommunications</b>	friends/family/acquaintances by using social media and technology (phone, computer, etc.), in the last two weeks prior to survey.	Rarely	44 (12)
<b>Financial concerns</b>	Concerns about financial matters or fear of decreased income since the pandemic began.	Always	49 (13)
		Occasionally	190 (50)
		Rarely	138 (37)
<b>Frequency of exposure to COVID-19 information</b>	In a week, how often are they updated regarding the current situation of COVID-19, such as: number of cases, deaths, epidemiology, advances in treatment, diagnosis, etc.	Always	40 (11)
		Occasionally	194 (51)
		Rarely	143 (38)
<b>Physical exercise</b>	Days per week of exercise, during the pandemic.	Never	114 (30)
		1 day per week	52 (14)
		2 - 3 days per week	94 (25)
		4 - 5 days per week	83 (22)
		6 - 7 days per week	34 (9)
<b>Loss of a loved one</b>	Loss of a loved one during the pandemic, by any cause of death.	Yes	153 (40)
		No	225 (60)

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