

Mental health determinants during covid-19 in Mexico

Abstract

Background: The COVID-19 pandemic triggered different psychological problems such as anxiety, depression, and somatization, and the factors that influence the emergence of these problems must be identified. Objective. To identify the sociodemographic and individual variables most strongly associated with the presence of mental health symptoms.

Methods: A cross-sectional design was used with an online survey answered by 7,693 participants from the general population in Mexico during the first wave of the COVID-19 pandemic.

Results: The odds of developing anxiety was higher in women (aOR = 2.20, 95% CI: 1.36–3.57), young adults (aOR = 3.81, 95% CI: 1.44–10.06), people with dependent children (aOR = 0.28, 95% CI: 0.12–0.67), people with a mental disorder (aOR = 3.33, 95% CI: 1.62–6.84), and in those who reported three or more hours a day getting informed about COVID-19 (aOR = 3.32, 95% CI: 1.25–8.79). Likewise, middle-aged adults (aOR = 3.00, 95% CI: 1.64–5.49), people with health problems (aOR = 2.04, 95% CI: 1.28–3.25) and with elderly dependents (aOR = 0.35, 95% CI: 0.17–0.75) are collectives with vulnerability factors that also strongly contribute to depression.

Conclusions: Gender, age, and information are risk factors for the development of psychological problems during the COVID-19 pandemic. People with mental disorders appear as risk groups.

Keywords: COVID-19, anxiety, depression, somatization, cross-sectional study

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Introduction

The World Health Organization declared the emergency caused by COVID-19 as a global pandemic on March 11, 2020. In Mexico, a national health emergency was declared on March 30, 2020, thus interrupting non-essential activities in all sectors with the objective of mitigating the transmission of the SARS-CoV-2 virus and reducing deaths in the population. The quarantine period lasted 62 days, in which citizens were asked to stay at their homes and adopt measures of self-care, physical-social distancing and halting of face-to-face school activities. There is a significant body of literature regarding the negative impact of COVID-19 on people's mental health. The epidemic implied not only the risk of death due to contagion but also social alarm with cognitive, affective, behavioral, and social disturbances in many countries of the world.¹⁻⁵

A systematic review with meta-analysis on the psychological state of people during the pandemic reports that the highest prevalence of anxiety in the Asian continent was 31.9%, while in Europe was 23.8%. Regarding depression, the highest prevalence in Asia was 35.3% and in Europe was 32.4%.⁶ Another review found that the combined prevalence for anxiety and depression was 33% and 28% respectively, and that prevalence increased to 56% for anxiety and 55% for depression in patients infected with the coronavirus and in those who had other pre-existing conditions.⁷ A cross-sectional study by Priego-Parra et al.,⁸ in a Mexican population with 561 participants found that, during the initial phases of the pandemic, the prevalence for anxiety and depression was 50% and 27.6% respectively. Some factors that may increase the risk of developing mental health problems during the pandemic have been identified. Women in general are more likely to develop depression and anxiety,^{9,10,5} those who belong to a

lower socioeconomic level and lack social support,^{11,12,10} people who have conflictive relationships with their partners,¹³ those who have a lower educational level,¹⁴ female adolescents,^{15,16} older adults in social isolation,^{1,17} stressed families,¹⁸ people fearful of being infected with the coronavirus,^{3,19} and people with chronic diseases not infected with the coronavirus.²⁰

The objective of this study is to identify the sociodemographic and individual variables most strongly associated with the presence of mental health symptoms to help prevent mental health problems in the future and to address public policies on mental health in the face of upcoming pandemics. Knowing if the levels of symptoms in anxiety, depression and somatization are high during the COVID-19 pandemic will allow guiding measures to support the most affected groups in public health.

Methods

Study design

A cross-sectional design, based on the administration of a confidential online questionnaire was used as part of the international PSY-COVID study. The study was conducted in 30 countries, and more than 150 researchers from 56 academic institutions participated. This article reports the results of the instrument disseminated in Mexico for approximately one month (June-July) during the first wave of the COVID-19 pandemic.

Participants

The final sample consisted of 7,693 adult participants with a mean age of 36.37 years, (SD = 14.19, range = 16-83), recruited from

different Mexican states with the following distribution: Nuevo León (18.3%), Jalisco (13%), Aguascalientes (10%), Mexico City (9.7%), San Luis Potosí (7.6%), Nayarit (5.9%), Tamaulipas (5.8%), Morelos (5%), Puebla (4.9%), Chihuahua (3%), Baja California (2.7%) and other states (13.7%). The inclusion criteria were: (a) Being over 16 years of age, and (b) living in Mexico during the first wave of COVID-19.

Procedure

The PSY-COVID questionnaire was developed by a panel of 30 international researchers who are experts in public health, clinical and health psychology. The state of the art on mental health was considered and the selected measures and instruments went through linguistic and content validation. A usability analysis of the questionnaire was performed to ensure understanding. All participants were informed that they would participate in a study developed by universities from 30 countries to assess the psychosocial effects of COVID-19 pandemic to improve the prevention and the spread of coronavirus. The dissemination of the questionnaire was based on the snowball method by using various social networks (Facebook, Instagram, WhatsApp, Twitter, etc.), communication media (newspapers, radio, etc.), and institutional contacts (universities, schools, etc.). At the beginning of the questionnaire there was a link so that the participant could obtain detailed information about the study. An e-mail address was also provided to contact the general coordinator of the international project to answer any questions. Likewise, special recommendations were given to participants who responded from a mobile phone to facilitate the response process. They were also informed the questionnaire would take around 15 minutes to be answered. The participants gave their informed consent by answering anonymously and were also told that they could abandon the questionnaire at any time if they wished. Participants were informed that, in the case of being younger, consent would be granted by parents or legal guardians. The questionnaire was designed in a way that blocked leaving blank answers, thus preventing missing values.

Measures

Sociodemographic characteristics

Participants were asked to answer questions about their gender, age, income level, educational level, if they were infected with coronavirus, their health condition, their collective membership (health personnel, teachers, disabled or mentally disturbed), if they had dependents at home (children, elderly or disabled) and the time they devoted to being informed about COVID-19 daily (none, <1 hour, 1-2 hours, 3> hours).

Mental health measures

To measure anxiety symptoms, the two-item Generalized Anxiety Disorder (GAD-2) scale was used.^{21,22} Participants rated each item on a 4-point ordinal scale, ranging from 0 (*not at all*) to 3 (*almost every day*), with higher scores indicating higher levels of anxiety within the past two weeks. The total GAD-2 score ranges from 0 to 6, while the cutoff point for detecting the presence of anxiety symptoms is 3 or more points. An adequate internal consistency of the instrument was obtained in the sample ($\alpha = .78$). The 2-item Patient Health Questionnaire (PHQ-2) was used for the diagnosis of depression established by the DSM-V.^{21,22} Participants rated each item on a 4-point ordinal scale, ranging from 0 (*not at all*) to 3 (*almost every day*), with higher scores indicating higher levels of depression within the past two weeks. The total PHQ-2 score ranges from 0 to 6, while the cut-off point for detecting the presence of depressive

symptoms is 3 or more points. An adequate internal consistency of the instrument was obtained in the sample ($\alpha = .77$). The Somatic Symptom Questionnaire (SSQ-5) developed by the researchers of the international study PSY-COVID, based on the meta-analysis study by Zijlema et al.,²³ was used to measure somatic symptoms of different scales that measure somatization. A 4-point Likert scale was used, ranging from 0 (no day) to 3 (almost every day). The score range is 0 to 15, and scores equal to or greater than 5 indicate the presence of somatic symptoms. An adequate internal consistency was obtained in the sample ($\alpha = .76$).

Data analysis

Statistical analyses were performed with SPSS v.22 (SPSS Inc., Chicago, IL, US). Descriptive analysis for the prevalence of anxiety, depression and somatization in the sample was carried out using frequencies and percentages. The presence/absence of anxiety, depression or somatization symptomatology was operationalized using the cut-off point reported above (≥ 3 for anxiety and depression; ≥ 5 for somatization). Participants were classified into three age groups (young, middle age and older) according to the following cut-off points: 16-39, 40-59 and 60 and above. The multivariate logistic regression models examined the impact of each of the social (sex, age, income level and educational level) and individual variables (contagion with coronavirus, health condition, collective membership, having dependents during the pandemic and time spent per day learning about COVID-19) in each of the three mental health variables of interest. The adjusted odds ratios (aOR) were estimated and the discrimination of the three instruments used in the different models was analyzed. The AUC curve measured the discrimination ability of the scores, considering that an AUC = 0.75 is in the middle of non-discrimination ability (AUC = 0.50) and perfect discrimination (AUC = 1.00; Cerdá & Cifuentes, 2011).²⁴ Values of $p < .05$ were considered statistically significant in the present study. There were no missing data for any of the variables evaluated because the items were forced choice in the form.

Results

Sample characteristics

The sample consisted of 7,693 people, 69% were women and 57.5% were between 16 and 37 years old. At the same time, 75.7% of the respondents reported a medium socioeconomic level and 93.6% had university studies. Table 1 shows the main sociodemographic characteristics.

Impact of restriction measures on mental health

Prevalence

In general, 11.7% of the sample showed a prevalence of risk for anxiety (women = 13.4%; men = 7.5%), 23.7% for depression (women = 25.5%; men = 19%), and 25.6% for somatic symptoms (women = 29.5%; men = 16.2%).

Social and individual determinants of mental health. The results of the multivariate models for the social and individual determinants related to the dimensions that affect mental health appear in Table 2.

Sex

Female participants showed the highest significant prevalence of risk for anxiety (80.2%; aOR = 2.20; 95% CI = 1.36–3.57) and somatization (80.5%; aOR = 1.89; 95% CI = 1.41–2.53). With respect to depression, no statistically significant differences were identified in both sexes.

Table 1 Sociodemographic data

Variable	N (%)
Sex	
Women	5310 (69.0)
Men	2343 (30.5)
Age group	
Young adults	4428 (57.6)
Middle-age adults	2705 (35.2)
Older adults	557 (7.2)
Income level	
Low	1102 (14.3)
Middle	5826 (75.7)
High	765 (9.9)
Education level	
Basic studies	489 (6.4)
University studies	7200 (93.6)
Personal contagion	
Not infected with coronavirus	7097 (92.3)
Infected with coronavirus	489 (6.3)
Health condition	
No health problems	2506 (32.6)
With health problems	695 (9.0)
Collective membership	
Health personnel	541 (7.0)
Teaching staff	1965 (25.5)
Disabled	30 (0.4)
With mental disorder	201 (2.6)
People under responsibility during lockdown	
Children	2261 (29.4)
Older people	1081 (14.1)
People with disabilities	82 (1.1)
Time spent learning about COVID-19	
None	583 (7.6)
Less than 1 hour per day	4708 (67.2)
Between 1 and 2 hours per day	2001 (26.0)
3 or more hours per day	401 (5.2)

Note: N = 7693.

Table 2 Logistic regression models of social and individual determinants associated with mental health risks

Anxiety (GAD-2)*					Depression (PHQ-2)*					Somatization (SSQ-5)*				
Variables	Prev.	aOR	95% CI	Sig.	Prev.	aOR	95% CI	Sig.	Prev.	aOR	95% CI	Sig.		
Sex														
Women	80.2	2.2	1.36-3.57	p =.001	75.3	1.32	0.97-1.79	p =.075	80.5	1.89	1.41-2.53	p < .001		
Men (Ref)	19.8	1			24.7	1			19.5	1				
Age Group														
Young adults	78	3.81	1.44-10.06	p =.007	75.2	3	1.64-5.49	p < .001	71.2	2.99	1.65-5.40	p < .001		
Middle-age adults	19.6	1.99	0.75-5.25	p =.162	21.9	1.81	1.00-3.27	p =.048	26.4	1.86	1.04-3.31	p =.035		
Older adults (Ref)	2.4	1			2.9	1			2.4	1				
Income level														
Low	23.2	1.45	0.70-2.99	p =.311	21.9	1.13	0.64-1.96	p =.666	17.9	1.4	0.81-2.41	p =.226		
Middle	69.4	0.73	0.38-1.36	p =.326	70.6	0.73	0.46-1.15	p =.179	74.7	1.1	0.70-1.72	p =.675		
High (Ref)	7.5	1			7.5	1			7.4	1				
Education level														
Basic studies (Ref)	8	1			7.9	1			7.4	1				
University studies	92	0.82	0.42-1.63	p =.585	92.1	0.63	0.39-1.04	p =.071	92.6	0.78	0.47-1.27	p =.320		
Personal contagion with coronavirus														
Not infected (Ref)	91.1	1			91.3	1			90.8	1				
Infected with coronavirus	8.9	1.29	0.66-2.53	p =.445	8.7	1.38	0.83-2.31	p =.209	9.2	2.18	1.39-3.42	p =.001		
Health condition														
No health problems (Ref)	57.9	1			62.8	1			68.8	1				
With health problems	42.1	1.52	0.81-2.84	p =.189	37.2	2.04	1.28-3.25	p =.003	31.2	1.67	1.08-2.57	p =.019		
Anxiety (GAD-2)*					Depression (PHQ-2)*					Somatization (SSQ-5)*				
Variables	Prev.	aOR	95% CI	Sig.	Prev.	aOR	95% CI	Sig.	Prev.	aOR	95% CI	Sig.		
Collective membership														
Health personnel (Ref)	18.1	1			18.6	1			18.6	1				
Teaching staff	39.8	1.03	0.61-1.74	p =.902	44.1	1.02	0.69-1.51	p =.903	50.3	0.95	0.67-1.35	p =.955		
Disabled	1.2	0.78	0.09-6.66	p =.820	1.7	0.94	0.23-3.82	p =.941	0.6	0	---	p =.999		
With mental disorder	24	3.33	1.62-6.84	p =.001	16.9	2.03	1.08-3.83	p =.028	13.6	1.86	1.00-3.45	p =.049		
People under responsibility														
Children	46.9	0.28	0.12-0.67	p =.004	50.6	0.2	0.09-0.42	p < .001	59.5	2.35	0.95-5.80	p =.062		
Older people	46.9	0.56	0.24-1.30	p =.180	43.7	0.35	0.17-0.75	p =.007	37.4	2.69	1.09-6.65	p =.031		
Disabled (Ref)	6.9	1			5.8	1			3.1	1				
Time spent learning about COVID-19														
None (Ref)	6.9	1			7.8	1			8.4	1				
Less than 1 h	57.3	1.21	0.52-2.77	p =.649	59.9	1.57	0.83-2.95	p =.161	61.3	1.43	0.84-2.44	p =.179		
1-2 hours per day	28.8	1.49	0.63-3.53	p =.363	26.1	1.72	0.89-3.31	p =.104	25.1	1.05	0.60-1.85	p =.850		
3 or more hours	6.9	3.32	1.25-8.79	p =.016	6.3	3.5	1.62-7.55	p =.001	5.1	1.75	0.87-3.53	p =.114		

Note: Prev = prevalence; aOR = adjusted odds ratio; CI 95% = 95% confidence interval; GAD-2 = Generalized Anxiety Disorder Questionnaire; PHQ-2 = Patient Health Questionnaire; SSQ-5 = Somatic Symptoms Questionnaire; p-values < .05 are highlighted in bold.

Age group

The group of young adults (16-39 years) reported the highest significant prevalence of risk for anxiety (78%; aOR = 3.81; 95% CI = 1.44–10.06), depression (75.3%; aOR = 3.00; 95% CI = 1.64–5.49) and somatization (71.2%; aOR = 2.99; 95% CI = 1.65–5.40). However, middle-aged adults (40-59 years) also showed a significantly higher risk for depression (21.9%; aOR = 1.81; 95% CI = 1.00–3.27) and somatization (26.4%; aOR = 1.86; 95% CI = 1.04–3.31) when compared to older adults.

Income level

No significantly higher prevalence by income level was found on any of the mental health variables.

Education level

No significantly higher prevalence by educational level was found on any of the mental health variables.

Infected with COVID-19

The highest prevalence of somatization risk was found in the participants who reported having been infected with the coronavirus (9.2%; aOR = 2.18; 95% CI = 1.39–3.42). No statistically significant differences were found in the other mental health indicators.

Health condition

People who reported having health problems had the highest significant prevalence of risk for depression (37.2%; aOR = 2.04; 95% CI = 1.28–3.25) and somatization (31.2%; aOR = 1.67; 95% CI = 1.08–2.57).

Collective membership

The group of people with mental disorders reported the highest significant prevalence of risk for anxiety (24%; aOR = 3.33; 95% CI = 1.62–6.84), depression (16.9%; aOR = 2.03; 95% CI = 1.08–3.83) and somatization (13.6%; aOR = 1.86; 95% CI = 1.00–3.45).

People under responsibility during lockdown measures

Those who reported having dependent children had the highest significant prevalence of risk for anxiety (46.9%; aOR = 0.28; 95% CI = 0.12–0.67) and depression (50.6%; aOR = 0.20; 95% CI = 0.09–0.42). However, those who indicated being in charge of elderly people also showed a significantly higher risk for depression (43.7%; aOR = 0.35; 95% CI = 0.17–0.75) and somatization (37.4%; aOR = 2.69; 95% CI = 1.09–6.65).

Time spent per day learning about COVID-19

People who reported regularly learning about COVID-19 three or more hours a day had the highest significant prevalence of risk for anxiety (6.9%; aOR = 3.32; 95% CI = 1.25–8.79) and depression (6.3%; aOR = 3.50; 95% CI = 1.62–7.55). No statistically significant differences were identified in somatization.

General accuracy of instruments in logistic regression models

The Generalized Anxiety Disorder scale (GAD-2) obtained an acceptable and significant discrimination (AUC = 0.75, 95% CI = 0.71–0.79). The Patient Health Questionnaire (PHQ-2) also achieved significant and acceptable discrimination (AUC = 0.71, 95% CI = 0.68–0.74), while the Somatic Symptom Questionnaire (SSQ-5) suggested unfavorable significant discrimination (AUC = 0.67, 95% CI = 0.64–0.70).

Ethical considerations

The study was approved by the Ethical Committee for Animal and Human Experimentation of the Autonomous University of Barcelona (Ref: CEEAH-5197).

Discussion

The present study is based on current evidence that has demonstrated the impact of sociodemographic and personal variables on people's mental health because of the mobility restrictions adopted during the first wave of the COVID-19 pandemic in Mexico. Based on the results, the prevalence of anxiety, depression, and somatization is 11.7%, 23.7%, and 25.6%, respectively. Previous studies have shown that the prevalence of these disorders is highly variable in different countries.^{25,20} It can be concluded that the prevalence in this study, when compared to normal circumstances prior to the pandemic, or when compared to the results obtained in other countries during COVID-19,^{7,8,6,26} is not high. Our results suggest that, from the social and individual determinants of mental health considered, the most

significant predictors are gender, age group, having people under responsibility during the pandemic, belonging to the group of people with a mental disorder and being informed daily for three or more hours about COVID-19. Women are a population particularly affected by anxiety and somatization problems, with prevalence percentages of 80.2% and 80.5% respectively. Women have been reported to be more susceptible to developing disorders such as anxiety, post-traumatic stress disorder, and major depression, due to neurobiological gender differences in responses to stress.²⁷ This finding is consistent with studies encouraging to pay attention to women as a vulnerable group for mental health problems due to the multiple roles they fulfill at home. Among these, their degree of involvement in children and other family members care, the traditional lack of co-responsibility of men in productive tasks at home, the expansion of mothers' role in the educational tasks of their children, the inherent difficulties in trying to balance productive needs with those of forced isolation, as well as the existing limitations during lockdown measures when they try to get external support for the care of children.^{15,9,7,26,14,16,28–32}

Responsibilities such as having dependent children is an explanatory variable strongly associated with anxiety and depression, while having elderly relatives contributes to depression and somatic symptoms in our population. The presence of children at home is a factor that worsens psychological health during the COVID-19 pandemic as shown in the study by Bruno et al.²⁸ On the other hand, an important finding is the fact that caring for the elderly represents a significant emotional burden for caregivers during the pandemic. It is likely that, because elderly people are highly dependent on the care and support of younger family members, this might contribute to generating greater discomfort and more concern about the multiple responsibilities in women.

The young and middle-aged adult age groups had a significantly higher risk of depression and somatization compared to older people. Similar results for depression are found in studies proposing that young adults show a significantly higher prevalence for depressive symptoms due to the excessive use of information from social networks, mobility restrictions and the interruption of social contact, therefore triggering stress responses as an adaptive mechanism.^{33,34,17,19} Regarding older adults, their non-significant levels of anxiety, depression and somatization are in line with those reported by Yang et al.³⁵ and Song et al.,¹⁴ suggesting the presence of better psychological adjustment skills due to a shorter time of exposure to social networks. On the other hand, this age group relies on experience as a factor that contributes to better adaptation and resilience in uncertain situations.³⁴

Another relevant determinant that has been found in our study is referred to those people who reported spending more than 3 hours a day consulting information on social networks about COVID-19. This result is in accordance with other studies that have shown an association between anxiety and the time people spend thinking about the personal risk derived from the pandemic, as explained by social learning theory.^{33,10,4,6,5} As pointed out by Rens et al.,¹⁰ it is possible that the excessive use of social networks specifically affected people who do not normally use the networks frequently, and who increased their use due to the pandemic.³⁶ The news about the increase in coronavirus infections and the number of deaths noticeably contributed to the development of negative emotions and depressive thoughts in the younger sector of the population.¹⁹ Nonetheless, the excessive use of social networks by itself in a representative sample of the American population from people 19 to 32 years of age was strongly associated with symptoms of depression and anxiety in conditions unrelated to the COVID-19 pandemic.³⁷

In our study, confinement exacerbates symptoms in people who have any mental disorder, in line with other studies that highlight the features of vulnerability to the impact of the pandemic in this group.^{38,39,34} In contrast, a longitudinal study by Pan et al.⁴⁰ found that the COVID-19 pandemic did not increase the severity of symptoms in patients who already had anxiety, depressive, or obsessive-compulsive disorders. It is likely that restrictive social distancing measures and the lack of availability of mental health support services during the pandemic emphasized the appearance of mental health problems, particularly in the younger population.¹⁰ Unlike what has been described in the literature, income or educational level were not factors that explained the emergence of mental health disorders during the pandemic, as other studies have reported.^{26,32}

This study had some limitations. The data were collected through an online survey, which implies the presence of biases in the selection of participants such as the oversampling of young people and women with a higher educational level. Therefore, the study population may not adequately represent the current pattern of the general population, as the most vulnerable people may not have been part of this research. In addition, the study design was cross-sectional, which makes it impossible to make inferences of causal relationships of the risk factors with the analyzed symptoms. From the results obtained in our research, despite that the results of other variables were not significant, we cannot conclude that our factors are the only ones that contribute to the degree of association with mental health disorders, since the sampling inaccuracy could have led to an underestimation of the effect of some sociodemographic variables that are particularly biased in the study.

Conclusion

Despite the limitations described above, the great population sample obtained from the Mexican population has allowed us to identify risk conditions for mental health problems in a pandemic context and target groups for which intervention strategies and other public mental health efforts must be addressed. Concretely, gender, age and information are risk factors for the development of anxiety, depression or somatization problems during the COVID-19 pandemic, and people with mental disorders and caregivers appear as risk groups. Moreover, the results of the study support the need to monitor psychological symptoms and socialization needs in the general population during the long COVID-19 pandemic, given that the psychological impact can last several months as reported in the literature.⁴¹

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Conflicts of interest

The authors declare they have no conflicts of interest.

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