

Psychological distress of COVID-19 pandemic and associated psychosocial factors among Mexican students: An exploratory study

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Abstract

COVID-19 related social isolation measures and school closures have likely increased students' stress levels. In our study, we assess the level of psychological distress and psychosocial factors among students in Mexico at the beginning of the pandemic. We conducted a cross-sectional exploratory study with 848 participants, the majority undergraduate or postgraduate (79.7%). Participants completed the Impact of Event Scale-Revised to measure emotions, and a COVID-19 questionnaire. We conducted a logistic regression analysis to find variables associated with stress: 36% ($n = 309$) had elevated stress, 31.4% ($n = 266$) anxiety, and 18.2% ($n = 154$) sadness often or all the time. Those who identified as women and reported a reduction in their incomes also reported a higher stress level. Stress was positively correlated with anxiety, anger, sadness, days in isolation, and hours watching TV daily; and negatively correlated with relaxation and happiness. The variable most strongly correlated with stress was a high perception of infection risk. Our findings will inform mental health strategies for students who are at higher risk of stress due to the COVID-19 pandemic response.

KEYWORDS

COVID-19, psychological distress, psychology, schools, students

1 | INTRODUCTION

In December 2019, a new virus was identified in the city of Wuhan, China. It was named COVID-19, and it rapidly spread to other regions of the country and worldwide (Dong & Zheng, 2020). In response, several countries governments ordered the cancellation of public activities and the closure of schools to prevent the propagation of the virus (Wang et al., 2020).

In Mexico, the first case of COVID-19 was confirmed on February 28th, 2020 (Secretaría de Salud, 2020a). However, it was not until March 14th that the Secretary of Public Education (Secretaría de Educación Pública [SEP]) officially announced the closure of educational institutions, following the recommendations of the World Health Organisation regarding COVID-19 containment measures (SEP, 2020a). In response, the SEP urged teachers and students to observe voluntary isolation and continue learning at home by conducting virtual academic activities (SEP, 2020b).

Currently, Mexico is in phase 3 of COVID-19, thus the Secretary of Health recommended continuing voluntary isolation until at least May 30th (Secretaría de Salud, 2020b). This phase means a greater number of active outbreaks, propagation of the virus with more than one thousand active cases, and suspension of nonessential activities in the public, private, and social sectors with national reach (Secretaría de Salud, 2020b).

2 | STUDENT DISTRESS DURING THE PANDEMIC

High levels of clinically significant stress were reported among the Mexican population at the beginning of the COVID-19 pandemic (González Ramírez et al., 2020). Moreover, due to the pandemic and the containment measures, psychological disturbances have increased among college students in other countries, which has been associated with psychosocial factors such as sex, and families without a steady income, among others (Cao et al., 2020). The college and the high school student population has shown high levels of posttraumatic stress in the face of a traumatic event or catastrophe (Cusack et al., 2019; Liu et al., 2019). These posttraumatic stress symptoms may cause future detrimental effects in high school students on academic achievement, physical health, and family stability (Liu et al., 2019).

According to Horowitz's model, stress episodes consist of memories, ideas, and feelings evoked by the stressful event (Krupnick & Horowitz, 1981). This model states two significant responses to stress: intrusion and avoidance. Intrusion is characterized by repeated thoughts and images, nightmares, and intense pangs or waves of feelings. Avoidance responses include denial of the event's meanings and consequences, blunted sensation, and awareness of emotional numbness (Horowitz et al., 1979). Weiss and Marmar (1997) added a third response, namely, hyperarousal, which includes anger, irritability, hypervigilance, and difficulty concentrating.

Trauma brings significant changes in many different aspects, and it is vital to assess stress in the face of a traumatic event (Uzer et al., 2020). Furthermore, stress is associated with other psychological problems such as uncertainty, anxiety, and poor emotional regulation (Boelen, 2019; Weiss et al., 2019). Stress among students is caused not only by academic issues, but by environmental and social factors (Raufelder et al., 2018). Some of the stressors that adolescents may currently face are: prolonged isolation, fear of infection, frustration, boredom, inadequate access to information, lack of personal space at home, financial problems, lack of face-to-face contact with classmates, friends, and teachers/professors (Wang et al., 2020). Moreover, when child and adolescent students are out of school (e.g., holidays), they are less physically active, they consume more food/calories, have irregular sleep patterns, and spend more time in front of screens (Brazendale et al., 2017). Adding to the latter, it has been found in other studies that students tend to engage in risky health behaviors, such as not respecting COVID-19 isolation measures (Zhing et al., 2020). In addition to risky behaviors, sex differences have also been found regarding to stress and lifestyles. Young women have higher levels of stress, lower well-being, and increased sleepiness (Branson et al., 2019).

3 | PURPOSE OF THE PRESENT STUDY

Although various studies on the impact of COVID-19 have been conducted on the general population (Chew et al., 2020), among health workers (Liu et al., 2020) and patients (Duan & Zhu, 2020), few studies provide evidence of the psychological impacts that students are experiencing in response to the current COVID-19 pandemic.

In response to this crisis, this study aimed to study the prevalence of psychological distress among Mexican students at the beginning of the COVID-19 pandemic. Moreover, we aimed to investigate the association of psychological distress with sociodemographic issues: (1) sex, (2) age, (3) marital status, and (4) education; and with COVID-19 related variables: (1) reduction in activities, (2) related to isolation, (3) economic income reduction, (4) perception of infection risk, (5) hours watching TV daily, and (6) hours spent online daily.

4 | METHOD

4.1 | Study design and participants

We employed a cross-sectional exploratory study due to the lack of information in Mexico on the emotional distress of the COVID-19 pandemic. The sampling was nonprobabilistic. The volunteer participants were high school, undergraduate, or postgraduate students from private or public schools that agreed to participate. Inclusion criteria were students from the abovementioned educational levels who gave their informed consent to participate in the study.

The number of cases during the study period determined the sample size. In total, we received 848 responses.

The mean age was 22.03 ($SD = 5$) years, 643 (75.8%) were women, 793 (93%) single, 676 (79.7%) were undergraduate or postgraduate (Table 1).

4.2 | Procedure

We created an online survey through a google form. Recruitment was implemented with the snowball technique with volunteer students, sending the form to key persons belonging to some educational institution, particularly high schools and colleges. The duration of the survey was approximately 10–15 min. The survey was open from the 27th of March to the 2nd of April, 2020. Later, we deleted the data of participants who did not meet the inclusion criteria.

4.3 | Measurements

4.3.1 | Psychological distress

To evaluate the psychological distress, we applied the Impact of Event Scale-Revised (IES-R) to find the stress experienced since COVID-19. The revised scale version was developed by Weiss and Marmar (1997) based on Horowitz's posttraumatic stress model (Horowitz et al., 1979). It considers three subscales of stress: intrusion (nightmares, intrusive feelings, and imagery, dissociative-like re-experiencing), avoidance (numbing of responsiveness, avoidance of feelings, situations, and ideas), and hyperarousal (anger, irritability, hypervigilance, difficulty concentrating, heightened startle).

The scale is measured on a likert scale (0 = *Nothing* to 4 = *Very much*). Cut-off points were determined to suggest clinical stress, by obtaining a total score of 35 or more. For the subscales, a score equal to or <14 was

TABLE 1 Descriptive analysis of sociodemographic characteristics, stress, and COVID-19 variables

Variables	M ± SD	Total N (%)		Total stress N (%)		Intrusion N (%)		Avoidant N (%)		Hyperarousal N (%)	
		SC	CS	SC	CS	SC	CS	SC	CS	SC	CS
Age	22.03 ± 5.0										
Sex											
Female	-	643 (75.8)	257 (40.0)	457 (71.1)	186 (28.9)	456 (70.9)	187 (29.1)	529 (82.3)	114 (17.7)		
Male	-	205 (24.2)	52 (25.4)	168 (82.0)	37 (18.0)	167 (81.5)	38 (18.5)	188 (91.7)	17 (8.3)		
Marital status											
Has partner	-	55 (6.5)	20 (36.4)	39 (70.9)	16 (29.1)	39 (70.9)	16 (29.1)	43 (78.2)	12 (21.8)		
Single	-	793 (93.5)	289 (36.4)	586 (73.9)	207 (26.1)	584 (73.6)	209 (26.4)	674 (85.0)	119 (15.0)		
Education											
High school	-	172 (20.3)	62 (36.0)	133 (77.3)	39 (22.7)	124 (72.1)	48 (27.9)	150 (87.2)	22 (12.8)		
Undergraduate and/or postgraduate	-	676 (79.7)	247 (36.5)	492 (72.8)	184 (27.2)	499 (73.8)	177 (26.2)	567 (83.9)	109 (16.1)		
Reduction in activities											
Yes	-	627 (73.9)	237 (37.8)	457 (72.9)	170 (27.1)	458 (73.0)	169 (27.0)	531 (84.7)	96 (15.3)		
No	-	221 (26.1)	72 (32.6)	168 (76.0)	53 (24.0)	165 (74.7)	56 (25.3)	186 (84.2)	35 (15.8)		
Isolation											
Yes	-	752 (88.7)	286 (38.0)	546 (72.6)	206 (27.4)	545 (72.5)	207 (27.5)	632 (84.0)	120 (16.0)		
No	-	96 (11.3)	73 (76.0)	79 (82.3)	17 (17.7)	78 (81.3)	18 (18.8)	85 (88.5)	11 (11.5)		
Economic income reduction											
Yes	-	511 (60.3)	218 (42.7)	354 (69.3)	157 (30.7)	347 (67.9)	164 (32.1)	414 (81.0)	97 (19.0)		
No	-	337 (39.7)	246 (73.0)	271 (80.4)	66 (19.6)	276 (81.9)	61 (18.1)	303 (89.9)	34 (10.1)		
How many days in isolation?	11.54 ± 4.2	-	-	-	-	-	-	-	-	-	-

(Continues)

TABLE 1 (Continued)

Variables	M ± SD	Total N (%)		Total stress N (%)		Intrusion N (%)		Avoidant N (%)		Hyperarousal N (%)	
		SC	CS	SC	CS	SC	CS	SC	CS	SC	CS
How many people in your household are in isolation?	2.55 ± 1.6	-	-	-	-	-	-	-	-	-	-
How many hours of TV do you watch per day?	2.4 ± 2.9	-	-	-	-	-	-	-	-	-	-
How many hours a day do you spend online?	7.74 ± 7.2	-	-	-	-	-	-	-	-	-	-
Perception of risk of infection ^a	4.19 ± 2.4	-	-	-	-	-	-	-	-	-	-

Abbreviations: M, main; SC, subclinical stress; SS, clinical stress.

^aIt was evaluated in a scale ranging from 1 to 10, where 0 was no risk and 10 was high risk.

considered “normal,” from 15 to 20 “moderate” stress, and above 20 points as “severe” (Costa Requena & Gil Moncayo, 2007). For those who obtain a subclinical result in the normal category, despite presenting with symptoms of stress, they do not have a psychiatric disorder such as posttraumatic stress. Conversely, posttraumatic stress disorder may be indicated for those that present with clinical stress in the survey (Costa Requena & Gil Moncayo, 2007).

The scale has been validated in a Mexican population, finding a cronbach alpha of 0.88 of the total scale (Hernández Moreno & Landero Hernández, 2015). The subscales have shown high levels of reliability: intrusion $\alpha = .89$, avoidance $\alpha = .84$, and hyperarousal $\alpha = .82$ (Caamaño et al., 2011).

In addition to the IES-R, we created an emotions-related scale of 0-*Never* to 4-*All the Time*, where we asked, “In the last three days, how have you felt?,” with the following emotions as options: anxiety, relaxation, anger, happiness, and sadness. These emotions were considered based on previous studies that report the emotional state of students during the COVID-19 pandemic (Cao et al., 2020).

4.3.2 | Psychosocial factors

The psychosocial factors included sociodemographic characteristics and COVID-19-related variables. To assess the sociodemographic variables, a survey to collect sociodemographic data was generated and included: age, sex, marital status, and education level. Furthermore, the questions related to the COVID-19 were: (1) *Have you reduced your activities since the pandemic?* (1 = yes, 2 = no); (2) *Currently, are you in isolation due to the pandemic?* (1 = yes, 2 = no); (3) *How many days have you been in isolation?*; (4) *How many people that you live with are currently in isolation?*; (5) *Has your economic income been affected?* (1 = yes, 2 = no); (6) *How at risk do you feel of contracting COVID-19? Where 0 is no risk and 10 is high risk;* (7) *How many hours a day do you spend watching television?*; and, (8) *How many hours a day do you spend online?*

The questions were based on those reported in the literature regarding the psychosocial effects of isolation, such as fear of infection, financial loss, problems with other household members (Brooks et al., 2020), and the stress generated by hours on the internet (Dong & Zheng, 2020).

4.4 | Statistical analysis

Statistical Package for the Social Sciences (SPSS) v21 was used for data analysis. To describe the sociodemographic variables, frequencies, and percentages, or mean and SD were used, depending on the type of variable. According to the Kolmogorov-Smirnov test, a non-normal distribution in the quantitative variables was found and non-parametric statistics were used.

The stress variable was categorized as “Sub-clinical stress” (grouping normal stress) or “Clinical stress” (grouping “moderate and severe stress”). The χ^2 test was calculated to find the differences between subclinical and clinical stress, among the different groups.

Then, the Spearman's rho test was calculated to examine the bivariate correlation between the stress (IES), current emotions (anxiety, relaxation, anger, happiness, and sadness), and the COVID-19 variables (days in isolation, perception of infection risk, hours watching TV daily, and hours spent online daily).

Finally, a logistic regression analysis was applied to find the predictor variables for the presence of clinical stress and its subscales (intrusion, avoidance, and hyperarousal). The variables included in the models were those significant according to χ^2 test and to the bivariate correlations. We used a method “go: conditional,” with a starting point of 0.05 and an endpoint of 0.1, for the probability of the method, and a confidence interval of 95%. The Hosmer-Lemeshow adjustment statistic was calculated to evaluate the goodness of fit of the data.

4.5 | Ethical considerations

This study was performed in line with the principles of the Declaration of Helsinki. Approval was granted by the Ethical Committee of the *Instituto Mexicano del Seguro Social* (2020-1001-042). Informed consent was obtained from all individual participants included in the study, establishing confidential management of their data.

5 | RESULTS

5.1 | Prevalence of stress and sociodemographic data

The participants were 848 students. The descriptive analysis of the stress and the sociodemographic and COVID-19 variables are shown in Table 1.

Regarding participants' stress levels, 309 (36%) students presented clinical levels of stress, while 539 (64%) presented subclinical levels. Regarding the subscales of stress, 223 (26%) presented clinical levels of intrusion, 225 (26%) had clinical levels of avoidance, and 131 (15%) clinical levels of hyperarousal.

Related to the current emotions, 266 (31.4%) students presented anxiety, 172 (20.3%) anger and 154 (18.2%) sadness, "often" or "all the time." Moreover, 670 (79%) stated feeling relaxed and 642 (75.7%) happiness, "never" or "sometimes," currently.

5.2 | Variables associated with psychological distress

According to the χ^2 test, there were differences with respect to sex, isolation, and economic income reduction on total stress. Stress was found mainly in women ($\chi^2 = 14.312$, odds ratio [OR] = 1.576, $p < 0.001$), those in isolation ($\chi^2 = 7.280$, OR = 1.587, $p = 0.009$), and in those whose economic income was reduced ($\chi^2 = 21.498$, OR = 1.580, $p < 0.001$). We did not find significant differences in relation to marital status, education, and reduction in activities.

In relation to the three subscales, the women presented more intrusion ($\chi^2 = 9.490$, OR = 1.603, $p = 0.001$), greater avoidance ($\chi^2 = 8.869$, OR = 1.569, $p = 0.002$), and greater hyperarousal ($\chi^2 = 10.598$, OR = 2.138, $p < 0.001$). On the other hand, those with a reduction in their economic incomes, had more intrusion ($\chi^2 = 13$, OR = 1.569, $p < 0.001$), greater avoidance ($\chi^2 = 20.399$, OR = 1.773, $p < 0.001$) and greater hyperarousal ($\chi^2 = 12.297$, OR = 1.881, $p < 0.001$). Likewise, among those in isolation, there were higher levels of intrusion ($\chi^2 = 4.120$, OR = 1.547, $p = 0.048$).

With regard to the correlations, the stress was significantly correlated with all emotions-related questions and with COVID-19 variables. All correlations are shown in Table 2.

The variables included in the final logistic regression models were significant. According to the logistic regression models, sex, isolation, perception of infection risk, and economic income reduction were all associated with total stress, intrusion and avoidance. Hyperarousal was associated with sex, perception of infection risk, and economic income reduction (Table 3).

6 | DISCUSSION

The purpose of the present study was to investigate the psychological distress of the COVID-19 pandemic on students, its associations with sociodemographic issues, and with COVID-19 related variables. The results show the presence of clinical levels of stress in 36% of the students, with high levels of avoidance and intrusion.

TABLE 2 Bivariate correlation between emotions and COVID-19 variables

Variables	1 ^a	2	3	4	5	6	7	8	9	10
1. Total stress	-									
2. Anxiety	0.595**	-								
3. Relaxation	-0.292**	-0.337**	-							
4. Anger	0.471**	0.414**	-0.226**	-						
5. Happiness	-0.235**	-0.173**	0.512**	-0.219**	-					
6. Sadness	0.486**	0.519**	-0.223**	0.458**	-0.288**	-				
7. Days in isolation	0.073*	0.046	0.007	0.010	-0.007	0.026	-			
8. Perception of infection risk	0.196**	0.203**	-0.159**	0.099**	-0.060	0.090**	-0.001	-		
9. Hours watching TV daily	0.085*	0.052	0.003	0.046	-0.020	0.013	0.010	-0.039	-	
10. Hours spent online daily	0.089**	0.139**	-0.124**	0.125*	0.095**	0.167**	0.104**	-0.001	0.061	-

^a*r* values obtained by *p* Spearman's statistical test.

p* < 0.05; *p* < 0.001.

According to the emotion-related scale, 31.4% presented anxiety often or all the time, 20.3% reported feeling angry often or all the time, and 18.2% stated feeling sad often or all the time.

A high perception of infection risk and the number of hours spent online daily, were correlated with negative emotions, such as anxiety, anger, and sadness. Otherwise, being a woman, being in isolation, having a high perception of infection risk, and a reduction of economic income were the main variables associated with stress among the students.

The psychological consequences that students may have in the face of a pandemic have been reported elsewhere, including high levels of stress (Main et al., 2011). The percentage of students with clinical levels of stress in the present study is elevated compared to other studies presented during this pandemic (Cao et al., 2020).

The perception of infection risk by the virus was the factor that was associated with stress in students. This association was more robust in the dimension of intrusion, related to nightmares and intrusive thoughts, and in the dimension of hyperarousal, related to irritability, difficulty concentrating, and other hurdles. Moreover, this perception of infection risk was related to psychological changes such as anxiety, anger, and sadness. Unfortunately, the perception of infection risk is not always accompanied by a real risk in the population, as during a pandemic, the presence of irrational fears is widespread (Petropoulos & Makridakis, 2020). It should be highlighted that it is essential to help the population identify when there is a real risk of contamination through health education to increase their knowledge and good practices. This education should be designed for the at-risk population, as well as for someone who has identified as tending to not comply with recommendations, such as people with a lower level of education and young people (Zhing et al., 2020).

Isolation was another factor associated with stress, taking into account that they had already reported some impacts on mental health by finding themselves in quarantine, such as posttraumatic stress, exhaustion, irritability, insomnia, reduction in concentration, and some avoidance behaviors (Brooks et al., 2020). Furthermore, it is vital to contemplate the educational challenges students face in isolation, such as taking virtual classes, completing the academic year, and having sparse communication with their classmates and friends (Wang et al., 2020).

TABLE 3 Logistic regression analysis of stress and its subscales

Model	B	OR	r^2 ^a	95% CI		p
				Lower limit	Upper limit	
Total stress						
Sex	-0.642	0.526	0.099	0.365	0.758	0.001*
Isolation	-0.806	0.447		0.266	0.749	0.002*
Perception of infection risk	0.148	1.159		1.088	1.235	<0.001**
Economic income reduction	-0.645	0.525		0.385	0.715	<0.001**
Intrusion						
Sex	-0.571	0.565	0.082	0.376	0.849	0.006*
Isolation	-0.781	0.458		0.255	0.822	0.009*
Perception of infection risk	0.158	1.171		1.094	1.254	<0.001**
Economic income reduction	-0.566	0.568		0.403	0.799	0.001*
Avoidance						
Sex	-0.533	0.587	0.069	0.393	0.877	0.009*
Isolation	-0.561	0.571		0.327	0.995	0.048*
Perception of infection risk	0.105	1.111		1.040	1.188	0.002*
Economic income reduction	-0.704	0.495		0.351	0.697	<0.001**

TABLE 3 (Continued)

Model	B	OR	r^2 ^a	95% CI		p
				Lower limit	Upper limit	
Hyperarousal						
Sex	-0.850	0.427	0.091	0.247	0.740	0.002*
Perception of infection risk	0.187	1.205		1.112	1.307	<0.001**
Economic income reduction	-0.715	0.489		0.315	0.759	0.001*

^aNagelkerke's r^2 .

* $p < 0.05$; ** $p < 0.001$.

Communication alternatives, to maintain contact with friends and colleagues, have been recommended to cope with isolation and its adverse effects (Gallegos et al. 2020).

On the other hand, there were differences according to sex, reporting higher stress levels among women. This finding coincided with other studies that report that women presenting with higher levels of stress, anxiety, and depression in response to crisis (Al-Rabiaah et al., 2020; Wang et al., 2020). However, despite this difference between the sexes, most women's strategies in times of crisis tend to involve seeking social support, which leads to greater life satisfaction (Main et al., 2011). Knowing the differences between men and women allows us to generate strategies for further interventions.

Other variables related to stress include hours in front of the television and on the internet. Furthermore, hours on the internet was related to anxiety, anger, and sadness. This association may be due to the high content related to COVID-19, discussed daily across all communication media, including social media. Concerning this, Dong & Zheng (2020) present a disorder called "Headline Stress Disorder." This disorder is characterized by a highly emotional response derived from the excessive information of the media. In this sense, if the media can increase knowledge and strategies for COVID-19 prevention, false or exaggerated information could cause panic in the population, including information spread through social networks (Kaufman et al., 2020). Moreover, the main source of information for adolescents, is social networks (Gallegos et al. 2020). In addition, many hours spent online may be due to the online classes. Therefore, this can also provoke high levels of stress and anxiety (Sahu, 2020).

A reduction in economic income was associated with the presence of stress in this study. In a prior study of psychological responses of COVID-19 in students, the levels of anxiety were highest in those without a steady income (Cao et al., 2020). In addition, is important taking into account that the impact of a COVID-19 could be more devastating in some Latin American countries, due to the socioeconomic conditions (Rodríguez-Morales et al., 2020). Moreover, in Mexico, some students of public universities come from rural areas and/or have limited internet access, nor do they own a computer, which could increase stress levels (Fernández Fassnacht, 2017).

Despite the fact that countries of the Americas are quite diverse; similar physical, biological, psychological, and social dimensions underly the lines of action in health in the face of this pandemic (Gallegos et al. 2020).

Finally, it is important to highlight that the variables evaluated and included in the logistic regression model, despite obtaining significant results, the models presented explain little of the observed variance. In light of this, we suggest that future studies include further variables that are potentially associated with stress in students.

7 | LIMITATIONS AND RECOMMENDATIONS

The present study had some limitations. One of these was the nonprobabilistic sampling, through the application of the snowballing technique and the diversity of the sample, as this can result in bias when generalizing the results. Another limitation is the scale created to evaluate the current emotional state (anxiety, relaxation, anger, happiness, and sadness). The scale was created for this study and it does not have validation or confidence values, generating certain difficulties when replicating the study with other populations using the same scale. Moreover, some groups lacked heterogeneity (i.e., sex group), which could influence the finding of greater levels of stress in certain groups (i.e., women). Another possible limitation is the type of study (cross-sectional exploratory study), which is why it is recommended that future studies conduct prospective study designs such as experimental/quasi-experimental study designs oriented toward improving the mental health or well-being of students.

However, the findings of the present study allow us to find some of the immediate mental health reactions that students have during confinement. Furthermore, the findings are useful to identify some psychosocial needs and thus generate priority actions to improve the mental health of students.

The authors recommend that future studies include variables related to student stress, such as insomnia, drug consumption, personal history of mental disease, and coping strategies for combatting COVID-19.

8 | CONCLUSIONS AND CLINICAL IMPLICATIONS

Although strategies for psychological intervention are being generated for individuals diagnosed with COVID-19 (Duan & Zhu, 2020), it is crucial to establish action plans for the significant number of people that are currently in voluntary isolation at home due to the psychological implications that isolation brings (Brooks et al., 2020).

In this panorama, schools play a critical role, not only in the educational setting but also in the promotion of healthy habits such as physical activity, a healthy diet, sleep habits (Wang et al., 2020), and the promotion of strategies for preventing the spread of the virus such as the use of facemask (Chan et al., 2014). One of the educational commitments should include some of the above topics in the school curriculum (Wang et al., 2020). Besides, according to this study's findings, it is essential to include mental health strategies for students during the pandemic. It may comprise: limiting exposure to news related to the pandemic, promoting social interaction without physical contact, talking to someone about the symptoms experienced, such as fears of infection, and understanding that stress is normal in response to unknown situations. Other strategies may be to establish a social support network, maintain healthy habits for sleep, nutrition, and exercise, and practice techniques such as meditation (Ornell et al., 2020).

CONFLICT OF INTERESTS

The authors declare that there are no conflict of interests.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author.

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REFERENCES

- Al-Rabiaah, A., Temsah, M. H., Al-Eyadhy, A. A., Hasan, G. M., Al-Zamil, F., Al-Subaie, S., Alshome, F., Jamal, A., Alhaboob, A., Al-Saadi, B., & Somily, A. M. (2020). Middle East respiratory syndrome-corona virus (MERS-CoV) associated stress among medical students at a university teaching hospital in Saudi Arabia. *Journal of Infection and Public Health*, 13(5), 687–691. <https://doi.org/10.1016/j.jiph.2020.01.005>
- Boelen, P. A. (2019). Intolerance of uncertainty predicts analogue post-traumatic stress following adverse life events. *Anxiety, Stress, and Coping*, 32(5), 498–504. <https://doi.org/10.1080/10615806.2019.1623881>
- Branson, V., Palmer, E., Dry, M. J., & Turnbull, D. (2019). A holistic understanding of the effect of stress on adolescent well-being: A conditional process analysis. *Stress & Health*, 35(5), 626–641. <https://doi.org/10.1002/smi.2896>
- Brazendale, K., Beets, M. W., Weaver, R. G., Pate, R. R., Turner-McGrievy, G. M., Kaczynski, A. T., Chandler, J. L., Bohnert, A., & von Hippel, P. T. (2017). Understanding differences between summer vs. school obesogenic behaviors of children: The structured days hypothesis. *International Journal of Behavioral Nutrition and Physical Activity*, 14, 100. <https://doi.org/10.1186/s12966-017-0555-2>
- Brooks, S. K., Webster, R. K., Smith, L. E., Woodland, L., Wessely, S., Greenberg, N., & Rubin, G. J. (2020). The psychological impact of quarantine and how to reduce it: Rapid review of the evidence. *The Lancet*, 395(10227), 912–920. [https://doi.org/10.1016/S0140-6736\(20\)30460-8](https://doi.org/10.1016/S0140-6736(20)30460-8)
- Caamaño, L., Fuentes, D., González, L., Melpillán, R., Sepúlveda, M., & Valenzuela, E. (2011). Adaptación y validación de la versión chilena de la escala de impacto de evento-revisada (EIE-R). *Revista médica de Chile*, 139(9), 1163–1168. <https://doi.org/10.4067/S0034-98872011000900008>
- Cao, W., Fang, Z., Hou, G., Han, M., Xu, X., Dong, J., & Zheng, J. (2020). The psychological impact of the COVID-19 epidemic on college students in China. *Psychiatric Research*, 287, 112934. <https://doi.org/10.1016/j.psychres.2020.112934>

- Chan, D. K. C., Yang, S. X., Mullan, B., Du, X., Zhang, X., Chatzisarantis, N. L. D., & Hagger, M. S. (2014). Preventing the spread of H1N1 influenza infection during a pandemic: Autonomy-supportive advice versus controlling instruction. *Journal of Behavioral Medicine*, 38(3), 416–426. <https://doi.org/10.1007/s10865-014-9616-z>
- Chew, Q. H., Wei, K. C., Vasoo, S., Chua, H., Ch, & Sim, K. (2020). Narrative synthesis of psychological and coping responses towards emerging infectious disease outbreaks in the general population: Practical considerations for the COVID-19 pandemic. *Singapore Medical Journal*, 61(7), 350–356. <https://doi.org/10.11622/smedj.2020046>
- Costa Requena, G., & Gil Moncayo, F. (2007). Propiedades psicométricas de la escala revisada del impacto del evento estresante (IES-R) en una muestra española de pacientes con cancer. *Análisis y Modificación de Conducta*, 33(149). <https://doi.org/10.33776/amc.v33i149.1218>
- Cusack, S. E., Hicks, T. A., Bourdon, J., Sheerin, C. M., Overstreet, C. M., Kendler, K. S., Dick, D. M., & Amstadter, A. B. (2019). Prevalence and predictors of PTSD among a college sample. *Journal of American College Health*, 67(2), 123–131. <https://doi.org/10.1080/07448481.2018.1462824>
- Dong, M., & Zheng, J. (2020). Letter to the editor: Headline stress disorder caused by Netnews during the outbreak of COVID-19. *Health Expectations*, 23(2), 259–260. <https://doi.org/10.1111/hex.13055>
- Duan, L., & Zhu, G. (2020). Psychological interventions for people affected by the COVID-19 epidemic. *The Lancet*, 7(4), 300–302. [https://doi.org/10.1016/S2215-0366\(20\)30073-0](https://doi.org/10.1016/S2215-0366(20)30073-0)
- Fernández Fassnacht, E. (2017). Una mirada a los desafíos de la educación superior en México. *Innovación educativa*, 17(74), 183–207.
- Gallegos, M., Zalaquett, C., Luna Sánchez, S. E., Mazo-Zea, R., Ortiz-Torres, B., Penagos-Corzo, J. C., Portillo, N., Torres Fernández, I., Urzúa, A., Morgan Consoli, M., Polanco, F. A., Florez, A. M., & Lopes Miranda, R. (2020). Cómo afrontar la pandemia del coronavirus (COVID-19) en las Américas: Recomendaciones y líneas de acción sobre salud mental. *Revista Interamericana de Psicología*, 54(1), e10304.
- González Ramírez, L. P., Martínez Arriaga, R. J., Hernández-González, M. A., & De la Roca-Chiapas, J. M. (2020). Psychological distress and signs of post-traumatic stress in response to the COVID-19 health emergency in a Mexican sample. *Psychology Research and Behavior Management*, 2020(13), 587–589. <https://doi.org/10.2147/PRBM.S259563>
- Hernández Moreno, F. P., & Landero Hernández, R. (2015). Aspectos Psicosociales Relacionados con el TEPT en Pacientes con Cáncer de Mama. *Acta de Investigación Psicológica*, 5(1), 1881–1891.
- Horowitz, M., Wilner, N., & Alvarez, W. (1979). Impact of event scale: A measure of subjective stress. *Psychosomatic Medicine*, 41(3), 209–218. <https://doi.org/10.1097/00006842-197905000-00004>
- Kaufman, K. R., Petkova, E., Bhui, K. S., & Schulze, T. G. (2020). A global needs assessment in times of a global crisis: World psychiatry response to the COVID-19 pandemic. *BJPsych Open*, 6(3), e48. <https://doi.org/10.1192/bjo.2020.25>
- Krupnick, J. L., & Horowitz, M. J. (1981). Stress response syndromes. *Archives of General Psychiatry*, 38(4), 428–435. <https://doi.org/10.1001/archpsyc.1981.01780290062007>
- Liu, Q., Jiang, M., Yang, Y., Zhou, H., Zhou, Y., Yang, M., Xu, H., & Ji, Y. (2019). Prevalence of posttraumatic stress disorder (PTSD) and its correlates among junior high school students at 53 months after experiencing an earthquake. *Disaster Medicine and Public Health Preparedness*, 13(3), 414–418. <https://doi.org/10.1017/dmp.2018.76>
- Liu, Z., Han, B., Jiang, R., Huang, Y., Ma, C., Wen, J., Zhang, T., Wang, Y., Chen, H., & Ma, Y. (2020). Mental health status of doctors and nurses during COVID-19 epidemic in China. *The Lancet*, 7(4), 17. <https://doi.org/10.2139/ssrn.3551329>
- Main, A., Zhou, Q., Ma, Y., Luecken, L. J., & Liu. (2011). Relations of SARS-related stressors and coping to Chinese college students' psychological adjustment during the 2003 Beijing SARS epidemic. *Journal of Counseling Psychology*, 58(3), 410–423. <https://doi.org/10.1037/a0023632>
- Ornell, F., Schuch, J. B., Sordi, A. O., & Kessler, F. H. P. (2020). "Pandemic fear" and COVID-19: Mental health burden and strategies. *Brazilian Journal of Psychiatry*, 42(3), 232–235. <https://doi.org/10.1590/1516-4446-2020-0008>
- Petropoulos, F., & Makridakis, S. (2020). Forecasting the novel coronavirus COVID-19. *PLOS One*, 15(3), e0231236. <https://doi.org/10.1371/journal.pone.0231236>
- Raufelder, D., Lazarides, R., & Lätsch, A. (2018). How classmates' stress affects student's quality of motivation. *Stress & Health*, 34(5), 649–662. <https://doi.org/10.1002/smi.2832>
- Rodríguez-Morales, A. J., Gallego, V., Escalera-Antezana, J. P., Méndez, C. A., Zambrano, L. I., Franco-Paredes, C., Suárez, J. A., Rodríguez-Enciso, H. D., Balbin-Ramon, G. J., Savio-Larriera, E., Rísquez, A., & Cimerman, S. (2020). COVID-19 in Latin America: The implications of the first confirmed case in Brazil. *Travel Medicine and Infectious Disease*, 35, 101613. <https://doi.org/10.1016/j.tmaid.2020.101613>
- Sahu, P. (2020). Closure of universities due to coronavirus disease 2019 (COVID-19): Impact on education and mental health of students and academic staff. *Cureus*, 12(4), e7541. <https://doi.org/10.7759/cureus.7541>
- Secretaría de Educación Pública (2020a). *Boletín No. 72 De acuerdo con la Secretaría de Salud, la SEP instrumenta las medidas preventivas por COVID-19*. <https://www.gob.mx/sep/es/articulos/boletin-no-72-de-acuerdo-con-la-secretaria-de-salud-la-sep-instrumenta-las-medidas-preventivas-por-covid-19?idiom=es>

- Secretaría de Educación Pública. (2020b). *Comunicado conjunto No. 3 Presentan Salud y SEP medidas de prevención para el sector educativo nacional por COVID-19*. <https://www.gob.mx/sep/es/articulos/comunicado-conjunto-no-3-presentan-salud-y-sep-medidas-de-prevencion-para-el-sector-educativo-nacional-por-covid-19?idiom=es>
- Secretaría de Salud. (2020a). *Se confirma en México caso importado de coronavirus COVID- 19*. <https://www.gob.mx/salud/galerias/se-confirma-en-mexico-caso-importado-de-coronavirus-covid-19>
- Secretaría de Salud. (2020b). 095. *Inicia la fase 3 por COVID-19*. <https://coronavirus.gob.mx/2020/04/21/inicia-la-fase-3-por-covid-19/>
- Uzer, T., Beşiroğlu, L., & Karakılıç, M. (2020). Event centrality, transitional impact and symptoms of post-traumatic stress in a clinical sample. *Anxiety, Stress & Coping*, 33(1), 75–88. <https://doi.org/10.1080/10615806.2019.1695252>
- Wang, G., Zhang, Y., Zhao, J., Zhang, J., & Jiang, F. (2020). Mitigate the effects of home confinement on children during the COVID-19 outbreak. *The Lancet*, 395(10228), 945–947. [https://doi.org/10.1016/S0140-6736\(20\)30547-X](https://doi.org/10.1016/S0140-6736(20)30547-X)
- Weiss, D. S., & Marmar, C. R. (1997). The impact of event scale-revised. In J. P. Wilson, & T. M. Keane (Eds.), *Assessing psychological trauma and PTSD* (pp. 399–411). Guilford Press.
- Weiss, N. H., Nelson, R. J., Contractor, A. A., & Sullivan, T. P. (2019). Emotion dysregulation and post-traumatic stress disorder: A test of the incremental role of difficulties regulating positive emotions. *Anxiety, Stress, and Coping*, 32(4), 443–456. <https://doi.org/10.1080/10615806.2019.1618842>
- Zhing, B. L., Luo, W., Li, H. M., Zhang, Q. Q., Liu, X. G., Li, W. T., & Li, Y. (2020). Knowledge, attitudes, and practices towards COVID-19 among Chinese residents during the rapid rise period of the COVID-19 outbreak: A quick online cross-sectional survey. *International Journal of Biological Sciences*, 16(10), 1745–1752. <https://doi.org/10.7150/ijbs.45221>

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