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Depression as an effect of the COVID-19 pandemic in a sample of university students

Depresión como efecto de la pandemia COVID-19 en una muestra de estudiantes universitarios

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Resumen

Introducción: La pandemia de COVID-19 indujo alteraciones como ansiedad y depresión, que afectaron a la población infectada. Este estudio evaluó la depresión, efecto de las restricciones pandémicas en estudiantes de una universidad pública en México.

Métodos: Se envió la Escala Zung a través de una encuesta en línea para evaluar el posible estado de depresión entre los estudiantes, durante la segunda (Febrero 2021) y cuarta olas (Mayo 2022) de la pandemia.

Resultados: El porcentaje de casos con síntomas de depresión fue mayor durante la segunda ola de la pandemia (2021), que al final de la cuarta ola (2022), aunque este incremento fue significativo solo en las mujeres ($p < 0,001$). El análisis de los ítems de la escala de Zung mostró que el perfil sintomatológico de la depresión era común para ambos sexos en los clústeres de alteraciones psicológicas y psicosomáticas; las diferencias entre sexos se dieron en ítems de alteraciones fisiológicas. El porcentaje de casos sin depresión aumentó significativamente en mujeres estudiantes, posiblemente relacionado con las restricciones sociales, en los hombres no hubo efectos significativos. El perfil común de depresión se encontró en ítems del clúster de "alteraciones psicológicas", lo que sugiere que ambos géneros coincidieron en el impacto psicológico de la COVID-19. El clúster de alteraciones fisiológicas es lo que marcó la diferencia entre ambos sexos.

Conclusión: En mujeres universitarias en México, los casos con síntomas depresivos fueron mayores durante la segunda ola y disminuyeron hacia el final de la pandemia.

Palabras clave: depresión; COVID-19; pandemia; salud mental.

Abstract

Introduction: The COVID-19 pandemic induced alterations such as anxiety and depression, that may affect infected people. This study evaluated the depression as an effect of pandemic restrictions in students at a public university in Mexico.

Methods: A survey was conducted using the Zung Scale to assess depressive symptoms that may suggest a possible state of depression among students. The scale was sent online at the second (February 2021) and fourth (May 2022) waves of the pandemic.

Results: The percentage of cases with depressive symptoms was greater during the pandemic second wave, than at the end of the pandemic fourth wave, although this increment was only significant in women ($p < 0.001$). The analyses of Zung scale items showed that the symptomatologic profile of depressive students had common items for both sexes, in the clusters of psychological and psychosomatic alterations; the differences between sexes were mainly in items of physiological alterations. The percentage of cases without depression increased significantly in female students, possibly related to the end of the isolative restrictions, although in men there were no significant effects. A common profile of depression was found in items of the cluster of "psychological alterations", which suggests that both genders had similar psychological impact of COVID-19. The physiological alterations' cluster makes the difference for the diagnoses of depression between both sexes.

Conclusion: In female university students in Mexico, the cases with depressive symptoms was greater during the second wave of the pandemic and decreased towards the end of it.

Keywords: depression; COVID-19; pandemic; mental health.

Introduction

At the end of 2019, Li Wenliang, a Chinese ophthalmologist, detected a series of cases of infectious pneumonia of previously unknown etiology[1]. In later studies, a coronavirus was found as the cause of that pneumonia cases, which was like the SARS-CoV virus that had caused the severe acute respiratory syndrome (SARS). The new virus was named SARS-CoV-2[2, 3], it may cause symptoms of variable intensity similar to a common cold, but it may cause also an acute respiratory syndrome, called Coronavirus Disease 2019 (COVID-19)[2-4], that when a malignant immune response attacks the alveolar walls, this difficult the gaseous exchange leading to hypoxia which may produce fatal outcomes. Due to the rapid increase in the number of cases of COVID-19, it was declared a pandemic by the World Health Organization (WHO) in March 2020[3, 5].

The first Mexican case of COVID-19 was detected in February 2020[6]; the number of cases of COVID-19 was changing during the pandemic, due to fluctuations in the increase of infections. Periods with significant increases of infections followed by decreases were called "waves"; so far, four waves have been reported in México: from February to September 2020, from September 2020 to April 2021, from June to October 2021, and from December 2021 to March 2022[7]. This motivated the implementation of health policies that led to the population's confinement (COVID-19 lockdown), causing the schools' closure, switching them to online classes[8, 9]. Subsequently, the number of infections has decreased by the end of the fourth wave, allowing the return of schools to face-to-face classes[10].

Both, the danger posed by the viral infection as well as the solitude and boring of confinement, impacted the population in various aspects. A negative effect of confinement over physical activity and nutrition has been reported, due to the increment in the people's time spend sitting and consuming unhealthy diets[11, 12]. Women were also found to have lower caloric intake, although they increased snacks' intake[13]. At the psychosocial level, a state of vulnerability was found where social restriction, poor nutritional status and reduced physical activity led people to adopt unhealthy coping strategies, such as increased alcohol consumption and binge eating[14]; in the cognitive domain, persistent negative effects were found on students' behavioral and emotional functioning[15].

Regarding mental health, it was found that sleep disorders, post-traumatic disorders, depression and anxiety, showed increases along the COVID-19 pandemic, compared to the previous levels of these disorders[16, 17]. A survey of students aged 16-24 years reported a pandemic increase in anxiety and depression, as well as in the risk

of suicide[18]. A longitudinal study found an increase in anxiety and depression levels during the pandemic[19], another study followed the population for 20 weeks after the start of the pandemic, also finding an increase in anxiety and depression, which decreased as it progressed the pandemic[20]. Nevertheless, few studies have been conducted in Mexico regarding the pandemic; one study finds during the first and second waves of the pandemic a significant increase of stress level in adults aged 18 to 60; however, anxiety and depression did not show significant differences[21]. Another study found that the levels of anxiety, stress and depression, increased only during the third wave in people older than 60 years[22]. Another study found an increase in stress, anxiety, and depression in teachers, related to the pandemic[23]. In medical students, an increase in depression levels was found between April and December 2020, being more severe in women[24].

The objective of this work is to evaluate depressive symptoms in a students' sample of a public Mexican university at two moments of the pandemic, the first at the second wave of COVID-19[7], and the second at the end of the fourth wave, when the academic activities were returning to classrooms[10]. The survey was answered by students living in Mexico City, as well as in the metropolitan area and nearly states.

Methods

Two cross-sectional study were made to survey two different samples of students at two different pandemic times, the first during the second wave (February 2021), and the second during the end of the fourth wave (May 2022). Surveys were sent through an online platform.

A sample of 1,131 students from the Xochimilco Unit of the Universidad Autónoma Metropolitana was surveyed using the self-applicable scale of Zung (1965)[25], which was sent through an online survey platform. Students in an age range of 18 to 30 years were included; it was explicit that those who voluntarily agreed to answer the survey accepted the publication of the results. The survey was anonymous and there were 811 participants in the 2021 sample, and 320 in the 2022 sample.

Instrument

The Zung Depression Scale (ZDS)[25] was used to identify depressive symptoms which indicates a possible depressive episode; this scale has been validated in Mexico[26], it consists of 20 questions that assess several symptoms in the last two weeks. Each question has four Likert-type response options, ranging from 1 (rarely) to 4 (most of the time); the sum of the 20 questions indicates the degree of depression of the respondent: a score of less than 50 points indicates that the person does not have depression, a score between 50 and 59 suggests mild depression, between 60 and 69 points suggests moderate depression, and scores greater than 70 suggest states of severe depression in the people surveyed. The items are classified into 3 clusters: general symptoms, physiological alterations that includes a subgroup of psychosomatic alterations, and properly psychological alterations[25, 26]. Cases whit a possible depressive condition according to the Zung scale must be corroborated by a specialist, so it is considered a useful scale only for screening[26].

Analysis

The data were analyzed using descriptive statistics. Due to the women's sample size was different of that of men, to be able to compare their results, the data analyzed was their percentages instead of the number of cases. Differences between students with depressive symptoms at the different waves were analyzed using the Fisher-Freeman-Halton exact test, considering a significance level of $p<0.05$. Differences between items of each cluster of Zungs' scale were analyzed using Student's t-test ($p<0.05$).

Results

The surveyed population consisted of 1131 students, of which 413 participants were excluded for not meeting the study criteria. The 2021 sample consisted of 398 participants, 189 (47.5%) men and 209 (52.5%) women, and the 2022 sample had 320 participants, 134 (41.9%) men and 186 (58.1%) women.

The percentages of students with depressive symptoms in samples considered by year and sex, is showed at **Figure 1**. **Figure 1A** shows the percentage of cases without depressive symptoms, by sex and by year; there was more students without depressive symptoms at the fourth wave, just when the severity of the pandemic decreases ($p<0.05$), but the analysis by sex showed that this difference reached statistical significance only in women ($p<0.001$), while in men the difference was not significant ($p=0.275$). **Figure 1B** shows the percentage of cases with symptoms that suggest mild depression, also by sex and by year, here the percentage of cases with a possible mild depression decreased significantly from 2021 to 2022 in women ($p<0.01$), while in men the decrease was not significant ($p=0.329$). **Figure 1C** shows the percentage of cases with depressive symptoms including moderate and severe considered as a whole, also by sex and by year, here the decrease of moderate and/or severe depression cases from 2021 to 2022, was significant only in women ($p<0.001$), but not in men ($p=0.244$).

To compare the items of the Zung scale of each cluster, the student's t-test was used for analyzing each items' results by year, sex and level of depression. This procedure made possible to compare the items' level of subjects without depression, against those in

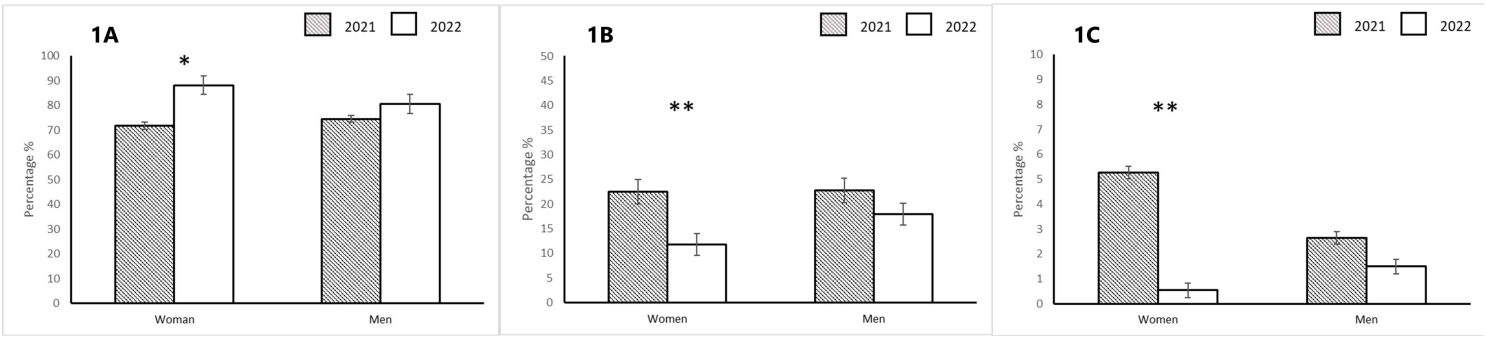

Figure 1.Percentages of cases with depressive symptoms among the student sample, considered by year. **A**, shows the percentage of cases without depressive symptoms, by sex and by year; **B**, shows the percentage of cases with symptoms corresponding to mild depression, also by sex and by year; and **C**, shows the percentage of cases with symptoms corresponding to moderate and severe depression, considered as a whole, also by sex and by year. The asterisk (*) represent a significance of $p<0.05$, while double asterisk (**) represent a significance of $p<0.01$.

subjects with mild depression, by each year, aiming to find those items that identificated a possible mild depressive episode (**Table 1**).

Table 1 shows that the symptomatologic profile of depression has 7 common items in both sexes to diagnose mild depression, and some items different by sex: 7 to diagnose depression in women and 3 items in men. Regarding the cluster at which items belong, we observed that the common for men and women items, predominated those of the cluster of psychological alterations (6 out of 7; 85.7%, those were identified by the letter C), with only one item from the cluster of psychosomatic alterations (14.3%, identified by the letter B.1.); however, in the items different by sex, the cluster of physiological alterations predominated in the group of women (3 out of 7, identified by the letter B; 42.9%), as well as in men (2 out of 3, letter B; 66.7%). In women, items from the subgroup of psychosomatic alterations were also found (2 out of 7; 28.6%, identified by the letter B-1); and in both sexes, different items were found between men and women, the cluster of psychological alterations were in 2 out of 7 women (28.6%, identified by the letter C) and in 1 out of 3 men (33.3%, identified by the letter C).

Discussion

The sample of students surveyed during the second wave of the pandemic and at the end of it, were similar, both in age and in the proportion of men and women. The Zung scale used in our survey have enough sensitivity to allows the finding of significant differences between groups such as: pregnant women that the condition of pregnancy increases cases of depression[27], or the increase of possible cases of depression by lung cancer[28] and glioma[29], or in adolescents with epilepsy that increase the depressive symptoms, compared to adolescents without epilepsy[30]. In cases without pathology, the application of the Zung scale in medical students reports a higher proportion of those with depression, compared to students of

Table 1. Profile of ítems found in depressive subjects, ordered by sex and cluster.

Profile for depression in women	Profile for depression in men
Items common to both sexes	*Items common to both sexes*
B.1 I get tired for no reason	B.1 I get tired for no reason
C I find it easy to do the things I used to	C I find it easy to do the things I used to
C I am restless and can't keep still	C I am restless and can't keep still
C I am more irritable than usual	C I am more irritable than usual
C I find it easy to make decisions	C I find it easy to make decisions
C I feel that I am useful and needed	C I feel that I am useful and needed
C My life is pretty full	C My life is pretty full
Items for depression in women	*Items for depression in men*
B Morning is when I feel the best	B I have trouble sleeping at night
B I still enjoy sex	B I eat as much as I used to
B I notice that I am losing weight	C I still enjoy the things I used to do
B.1 I have trouble with constipation	
B.1 My heart beats faster than usual	
C My mind is as clear as it used to be	
C I feel hopeful about the future	

Capital letters represent the cluster at which the ítems belong: A, Pervasive affects; B, Physiological equivalents or concomitants; B.1, Psychosomatic concomitants; C, Psychological concomitants.

another profession[31]; this result has been corroborated using other depression assessment instruments[32].

Our data show that the percentage of the surveyed population that was without depression was higher in the year 2022, compared to same population in the previous year (2021; **Figure 1**); contrarily, the population with a Zungs' score that identified a condition of probable depression was higher at the highest peak of the pandemic (2021), compared to the wave of 2022. However, the proportion of students with depressive symptoms was not the same in men as in women, so the decrease in the percentage of subjects with possible depression from 2021 to 2022 was only significant in women. This could suggest that the impact of the pandemic was milder in men, while women seem to react more to the conditions of the pandemic; this result is consistent with reports that found higher depression prevalence in women than in men[17]. A study in adolescents found that women showed a higher risk of anxiety and depression during the COVID-19 pandemic[33]. In Mexican population it was reported that the proportion of anxiety, depression and stress was higher in women, evaluated through the Depression Anxiety Stress Scale (DASS-21)[34]. In a longitudinal study, a more severe prevalence of depression was found in women[24]; furthermore, in other study in the Mexican population before the pandemic, the frequency of depression in medical students was also higher in women[32].

In the comparison of our results with reports that used the Zung scale to assess depressive symptoms in population samples, we found that the proportion of subjects with depression detected in this study is like several international reports. Studies that evaluated the possibility of students suffering[35-37].

Our study clearly shows a decrement in student's depressive symptoms during the year 2022. This decrement seems to correlate with the pandemics' severity decrease. The pandemic decrease caused changes in the social context, such as the sanitary measures at the university which allowed to return at conditions similar to those of pre-pandemic.

It is interesting that the items that define the depressive symptoms profiles of the respondents was different between women and men; only 7 items were similar between sexes, while the whole profile of depressive items changes with sex. The items common for both sexes were: "I find it easy to do the things I used to", "I am restless and can't keep still", "I am more irritable than usual", "I feel that I am useful and needed", "My life is pretty full", which belong to the cluster of psychological alterations. These items may be related with the students' environment, particularly with two social context factors: the isolation and the contagious risk. The students' routine was reduced to the activities at home, and to the needing of adapt their environment for continue doing activities such as sports, accepting the risk of contagion when leaving out, both for themselves and for their families. An impact was also reflected in the cluster of psychosomatic alterations in the item "I get tired for no reason", which can be related to a limited physical activity, and to the sedentary lifestyle adopted by a large part of the population at the beginning of the pandemic.

In women, the following items corresponding to the physiological cluster were found: "Morning is when I feel the best", "I still enjoy sex", "I notice that I am losing weight", in which the social restriction may have hindered partner activities, and weight loss may have been related to the impact of the pandemic over nutritional quality. Also, in the items of psychosomatic alterations of the following items: "I have trouble with constipation" and "My heart beats faster than usual", they could be associated with changes in diet and sedentary lifestyle during the pandemic. The cluster of psychological alterations in the items "My mind is as clear as it used to be" and "I feel hopeful about the future", could have been influenced by the social environment, as well as by the risk of contagion, social restriction, and the forced routine changes.

Although in men we did not find significant differences in depression levels related to the time of the pandemic, in the items to define depression there were also physiological alterations in the items: " I have trouble sleeping at night", and "I eat as much as I used to", these may derive from the routine changes secondary to the pandemic. In the psychological alterations cluster, the item "I still enjoy the things I used to do" may be understood as the individual identifying the things they usually enjoy, comparing their feelings in a social restriction situation.

The items common to both sexes are mostly from the cluster of "psychological alterations", which suggests that depression in both genders coincides in its psychological aspect, while the differences between men and women were shown in items of physiological and psychosomatic alterations. This suggests that both genders share a psychological profile with minimal variations, being the physiological-biological aspect the one that marks the difference between the items of both sexes, to possible diagnose of depressive states.

In conclusion, the increment in the percentage of students without depressive symptoms seems to correlate with the pandemic diminution. Possible depressive cases in women had significant differences during the Sars-CoV 2 pandemic, taking into account the state of confinement. In the second survey taken at the end of the fourth wave, the state of confinement was lower. This depressive effect may correlate with the increase in the possibility of contagious, as well as by the severity of confinement to which the students' sample was subjected. However, depression in men does not seem to have been modified by the effect of the pandemic.

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REFERENCES

1. Green A. Li Wenliang. Lancet. 2020; 395(10225): 682. DOI: 10.1016/S0140-6736(20)30382-2
2. Harrison A, Lin T, Wang P. Mechanisms of SARS-CoV-2 Transmission and Pathogenesis. Trends Immunol. 2020; 41(12): 1100-1115. DOI: 10.1016/j.it.2020.10.004
3. To KK, Sridhar S, Chiu KH, Hung DL, Li X, Hung IF, et al. Lessons learned 1 year after SARS-CoV-2 emergence leading to COVID-19 pandemic. Emerg Microbes Infect. 2021; 10(1): 507-535. DOI: 10.1080/22221751.2021.1898291
4. Kirtipal N, Bharadwaj S, Kang S. From SARS to SARS-CoV-2, insights on structure, pathogenicity and immunity aspects of pandemic human coronaviruses. Infect Genet Evol. 2020; 85: 104502. DOI: 10.1016/j.meegid.2020.104502
5. Muralidar S, Ambi S, Sekaran S, Krishnan U. The emergence of COVID-19 as a global pandemic: Understanding the epidemiology, immune response and potential therapeutic targets of SARS-CoV-2. Biochimie. 2020; 179: 85-100. DOI: 10.1016/j.biochi.2020.09.018
6. Suárez V, Suarez M, Oros S, Ronquillo E. Epidemiología de COVID-19 en México: del 27 de febrero al 30 de abril de 2020. Rev Clín Esp. 2020; 220(8): 463-471. DOI: 10.1016/j.rce.2020.05.007
7. Secretaría de Salud, Dirección General de Epidemiología. Informe Integral de COVID-19 en México. México, Ciudad de México. Número 07-2022, 08 de Junio de 2022.
8. Pérez-Ferrer C, López-Olmedo N, Bautista-Arredondo S, Colchero M, Stern D, Zepeda-Tello R, et al. Ciclos de trabajo-confinamiento para reducir la transmisión de Covid-19: evidencia y recomendaciones en el contexto de México. Salud Publica Mex. 2021; 63(2): 316-323. DOI: 10.21149/12105
9. Durá-Travé T. Home confinement for COVID-19 and weight gain in schoolchildren and adolescents. Nutr Hosp. 2020; 38(1): 213-214. DOI: 10.20960/nh.03417
10. Gallegos O. ¿La educación básica híbrida llegó tarde a México (ciclo escolar 2021-2022)? Sincronía. 2022; XXVI(82): 840-857. DOI: 10.32870/sincronia.axxvi.n82.40b22
11. Ammar A, Brach M, Trabelsi K, Chtourou H, Boukhris O, Masmoudi L, et al. Effects of COVID-19 home confinement on eating behaviour and physical activity: results of the ECLB-COVID19 international online survey. Nutrients. 2020; 12(6): 1583. DOI: 10.3390/nu12061583
12. Bertrand L, Shaw KA, Ko J, Deprez D, Chilibeck PD, Zello GA. The impact of the coronavirus disease 2019 (COVID-19) pandemic on university students' dietary intake, physical activity, and sedentary behaviour. Appl Physiol Nutr Metab. 2021; 46(3): 265-272. DOI: 10.1139/apnm-2020-0990
13. Gallo LA, Gallo TF, Young SL, Moritz KM, Akison LK. The impact of isolation measures due to COVID-19 on energy intake and physical activity levels in Australian university students. Nutrients. 2020; 12: 1865. DOI: 10.3390/nu12061865
14. Heinberg L, Steffen K. Social Isolation and Loneliness During the COVID-19 Pandemic: Impact on Weight. Curr Obesity Rep. 2021; 10(3): 365-370. DOI: 10.1007/s13679-021-00447-9
15. Copeland W, McGinnis E, Bai Y, Adams Z, Nardone H, Devadanam V, et al. Impact of COVID-19 Pandemic on College Student Mental Health and Wellness. J Am Acad Child Adol Psychiatr. 2021; 60(1): 134-141.e2. DOI: 10.1016/j.jaac.2020.08.466
16. Onyeaka H, Anumudu C, Al-Sharify Z, Egele-Godswill E, Mbaegbu P. COVID-19 pandemic: A review of the global lockdown and its far-reaching effects. Science Progress. 2021; 104(2): 003685042110198. DOI: 10.1177/00368504211019854
17. COVID-19 Mental Disorders Collaborators. Global prevalence and burden of depressive and anxiety disorders in 204 countries and territories in 2020 due to the COVID-19 pandemic. Lancet. 2021; 398 (10312): 1700-1712. DOI: 10.1016/S0140-6736(21)02143-7
18. Wathelet M, Duhem S, Vaiva G, Baubet T, Habran E, Veerapa E, et al. Factors Associated with Mental Health Disorders Among University Students in France Confined During the COVID-19 Pandemic. JAMA Net Open. 2020; 3(10): e2025591. DOI: 10.1001/jamanetworkopen.2020.25591
19. Zimmermann M, Bledsoe C, Papa A. Initial impact of the COVID-19 pandemic on college student mental health: A longitudinal examination of risk and protective factors. Psychiatry Res. 2021; 305: 114254. DOI: 10.1016/j.psychres.2021.114254
20. Fancourt D, Steptoe A, Bu F. Trajectories of anxiety and depressive symptoms during enforced isolation due to COVID-19 in England: a longitudinal observational study. Lancet Psychiatry. 2021; 8(2): 141-149. DOI: 10.1016/S2215-0366(20)30482-X
21. Toledo-Fernández A, Betancourt-Ocampo D, González-González A. Distress, Depression, Anxiety, and Concerns and Behaviors Related to COVID-19 during the First Two Months of the Pandemic: A Longitudinal Study in Adult MEXICANS. Behav Sci (Basel). 2021; 11(5): 76. DOI: 10.3390/bs11050076
22. Betancourt-Ocampo D, Toledo-Fernández A, González-González A. Mental Health Changes in Older Adults in Response to the COVID-19 Pandemic: A Longitudinal Study in Mexico. Front Public Health. 2022; 10: 848635. DOI: 10.3389/fpubh.2022.848635
23. Cortés-Álvarez NY, Garduño AS, Sánchez-Vidaña DI, Marmolejo-Murillo LG, Vuelvas-Olmos CR. A Longitudinal Study of the Psychological State of Teachers Before and During the COVID-19 Outbreak in Mexico. Psychol Rep. 2022: 332941221100458. DOI: 10.1177/00332941221100458
24. Domínguez-González AD, Guzmán-Valdivia G, Ángeles-Téllez FS, Manjarrez-Ángeles MA, Secín-Diep R. Depression and suicidal ideation in Mexican medical students during COVID-19 outbreak. A longitudinal study. Heliyon. 2022; 8(2): e08851. DOI: 10.1016/j.heliyon.2022.e08851
25. Zung WW. A self-rating depression scale. Arch Gen Psychiatry. 1965; 12: 63–70. DOI: 10.1001/archpsyc.1965.01720310065008
26. Rivera BM, Corrales AE, Cáceres Ó, Pina JA. Validación de la Escala de Depresión de Zung en Personas con VIH. Ter Psicol. 2007; 25(2): 135–40. Available in: https://www.redalyc.org/articulo.oa?id=78525204
27. Chen X, Hu W, Hu Y, Xia X, Li X. Discrimination and structural validity evaluation of Zung self-rating depression scale for pregnant women in China. J Psychosom Obstet Gynecol. 2020; 43(1): 26-34. DOI: 10.1080/0167482X.2020.1770221
28. Guo C, Huang X. Hospital anxiety and depression scale exhibits good consistency but shorter assessment time than Zung self-rating anxiety/depression scale for evaluating anxiety/depression in non-small cell lung cancer. Medicine. 2021; 100(8): e24428. DOI: 10.1097/MD.0000000000024428
29. Hao A, Huang J, Xu X. Anxiety and depression in glioma patients:

prevalence, risk factors, and their correlation with survival. Irish J Medical Sci (1971). 2020; 190(3): 1155-1164. DOI: 10.1007/s11845-020-02374-5

30. Nnajekwu CO, Nnajekwu UC, Ikefuna NA, Ojinnaka CN. Mental Health of Adolescents with Epilepsy in Enugu, Nigeria: A Cross-Sectional Study. J Child Neurol. 2021; 36(2): 116-122. DOI: 10.1177/0883073820954060
31. Shao R, He P, Ling B, Tan L, Xu L, Hou Y, et al. Prevalence of depression and anxiety and correlations between depression, anxiety, family functioning, social support and coping styles among Chinese medical students. BMC Psychology. 2020; 8(1). DOI: 10.1186/s40359-020-00402-8
32. Melo-Carrillo A, Van Oudenhove L, Lopez-Avila A. Depressive symptoms among Mexican medical students: High prevalence and the effect of a group psychoeducation intervention. J Affect Disorders. 2012;136(3): 1098-1103. DOI: 10.1016/j.jad.2011.10.040
33. Chen F, Zheng D, Liu J, Gong Y, Guan Z, Lou D. Depression and anxiety among adolescents during COVID-19: A cross-sectional study. Brain Behav Immun. 2020; 88: 36-38. DOI: 10.1016/j.bbi.2020.05.061
34. Pérez-Cano HJ, Moreno-Murguía MB, Morales-López O, Crow-Buchanan O, English JA, Lozano-Alcázar J, et al. Anxiety, depression, and stress in response to the coronavirus disease-19 pandemic. Cir. Cir. 2020; 88(5): 562-568. DOI: 10.24875/CIRU.20000561
35. Olmedo-Buenrostro BA, Torres-Hernández J, Velasco-Rodríguez R, Mora-Brambila AB, Blas-Vargas LA. Prevalencia y severidad de depresión en estudiantes de enfermería de la Universidad de Colima. Rev Enferm IMSS. 2006; 14(1): 17-22. Available in: https://www.medigraphic.com/pdfs/enfermeriaimss/eim-2006/eim061d.pdf
36. Yusvisaret-Palmer M, Prince R, Medina M, López D. Prevalencia de depresión en estudiantes de la Facultad de Medicina Campus Mexicali, Universidad Autónoma de Baja California, México. Rev Educ Cienc Salud. 2017; 14(1): 30-34. Available in: http://www2.udec.cl/ofem/recs/anteriores/vol1412017/artinv14117c.pdf
37. Yusvisaret-Palmer L, Palmer-Morales S, Medina-Ramírez M, López-Palmer D. Prevalencia de depresión durante la COVID-19 en estudiantes de medicina de una universidad privada mexicana. MEDISAN. 2021; 25 (3): 637-646. Available in: https://www.redalyc.org/articulo.oa?id=368467867006

CONFLICTS OF INTEREST

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PREVIOUS PRESENTATIONS

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