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Social Violence Increases the Risk of Suicidal Ideation Among Undergraduate Medical Students

Beatriz Escobar-Padilla,[a] Horacio Márquez-González,[b] Carolina Consejo y Chapela,[a] Ana Cecilia López-Sepúlveda,[c] and Ana Carolina Sepúlveda Vildósola[d]

[a]*Coordinación de Educación en Salud, Centro Medico Nacional Siglo XXI, Instituto Mexicano del Seguro Social, Ciudad de México, México*
[b]*Unidad Médica de Alta Especialidad, Hospital de Cardiología, Centro Medico Nacional Siglo XXI, Instituto Mexicano del Seguro Social, Ciudad de México, México*
[c]*Facultad de Psicología, Universidad Nacional Autónoma de México, Ciudad de México, México*
[d]*Unidad de Educación, Investigación y Políticas de Salud, Centro Medico Nacional Siglo XXI, Instituto Mexicano del Seguro Social, Ciudad de México, México*

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Background. Depression is highly prevalent worldwide, and may have fatal consequences. Violence is associated to psychopathology and has exponentially increased in some areas of Mexico. Healthcare professionals are vulnerable to increased anxiety, depression, suicide and lately, to violence by organized crime. The aim of the study was to determine the prevalence of anxiety/depression/suicidal ideation and the weight of social violence as a risk factor.

Methods. Cross sectional study in three generations of undergraduate medical students at entry to internship year in our institution. All students voluntarily agreed to participate. All of them answered Beck and HAM-A. Two generations also responded Plutchik suicidal risk inventory. Sex, type of university and degree of violence in their geographic areas were also recorded. Prevalence rates were calculated for each outcome. χ^2 tests and odds ratio (OR) for bivariate analysis, and Mantel-Hanezel to adjust according to level of violence.

Results. All of the eligible students responded the anxiety and inventories (n = 8,858), and 6,451 also responded the suicide risk test. Overall, 37.2% displayed severe anxiety, 14.9% moderate/severe depression and 8.5% suicidal ideation. Female sex and private university increased the risk for anxiety and depression. High violence, severe anxiety or depression increased the risk for suicidal ideation. Adjusted by violence zone, female sex, being single and the coexistence of depression were associated with a higher risk for suicidal ideation.

Conclusions. Anxiety, depression and suicidal ideation are highly prevalent among premedical interns in Mexico. Living in highly violent areas significantly increases the risk for anxiety/depression/suicidal ideation. © 2020 IMSS. Published by Elsevier Inc.

Key Words: Anxiety, Depression, Suicidal ideation, Medical students, Violence, Med Educ, Psychopathology.

Introduction

Depression is a chronic and recurrent illness that results from the sum of complex interactions between social, psychological and biological factors and is closely linked to anxiety (1,2). It has become a serious health problem worldwide since it is a hurdle for sustainable development and people's wellbeing. Furthermore, it is associated with

Address reprint requests to: Ana Carolina Sepúlveda Vildósola, Sótano de la Unidad de Congresos, Bloque B., Centro Médico Nacional SXXI, Instituto Mexicano del Seguro Social, Av. Cuauhtémoc 330, Colonia Doctores, Alcaldía Cuauhtémoc, 06725, Ciudad de México, México; E-mail: ana.sepulvedav@imss.gob.mx

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an increased risk of early death (3). Considered as the main cause of morbidity across the world by the World Health Organization (WHO), this illness affects 300 million people worldwide and half of them do not receive proper medical treatment (4,5). Studies show that being female is a risk factor for depression and anxiety, although it is males who have a bigger risk of committing suicide (6).

According to the Organization for Economic Cooperation and Development (OECD), countries in which the frequency of depression is 20% have economic consequences that can add up to a trillion dollars due to the low productivity, absenteeism and inefficiency in work performance (7).

In Mexico, the National Survey on Psychiatric Epidemiology (ENEP) (2003) reported that 9.1% of the Mexican population has suffered an affective disorder sometime during their lives, and 4.5% one-year prior. Major depression represented 3.3 and 1.5% respectively (8). By 2013, the prevalence of major depressive disorders in adolescents was 7.8% and 20% for geriatric population (9). More recently (2019), a prevalence of 16% was reported in 116,214 high school and college students in Mexico City, using the CES-D scale (10). In our country, this illness is responsible for 7.6% of the causes of disability, surpassing the percentages found in USA and Canada (7.4 and 5.9% respectively). On the other hand, anxiety accounts for up to 3.5% of disability causes, which is considered low for the region of the Americas where Brazil tops the list with levels of up to 7.5% or the USA, where this percentage is 4.1%. However, Mexico still outranks Canada, whose levels are of 3.4% (11).

Risk factors for depression include unemployment, marital status (divorced/separated/widowed), family or personal history of depression, living alone, a history of abuse during childhood or adolescence, or current abuse, caring for a sick relative, social isolation, legal problems, domestic violence, addictions and migration. Women are 1.7 times more likely to experience depression than men (8,12,13).

Suicide is the most severe consequence of depression. In 2018, the Pan-American Health Organization (PAHO) reported that it represents, together with self-aggression, the fifth reason for loss of years of life from disability. The WHO reported for 2015–2020 that, in the region of the Americas, suicide had passed from the 4th to the 3rd cause of mortality in the 20–24 age group. Although Mexican rates of suicide have increased dramatically (Figure 1), they are still underneath those in the USA and Canada (11).

Healthcare professionals are particularly vulnerable to display anxiety and depression symptoms due to their difficult professional dynamics, characterized by extensive laboral periods, frequent night shifts (twice or more per week), continuous exposure to sickness and death, lack of regularity in meal times and workplace violence. Depressed physicians frequently have a higher prevalence of burnout, poor self-reported physical health, and lack of regular physical exercise (14). They also refer low sense of professional efficacy and job satisfaction, emotional exhaustion, sleeping problems, chronic diseases and alcohol/drug consumption (2,15). Worldwide reports acknowledge that up to 60% of doctors are depressed (16), compared to 3.3–21.4% in general worldwide population. It is frequent that anxiety and depression coexist.

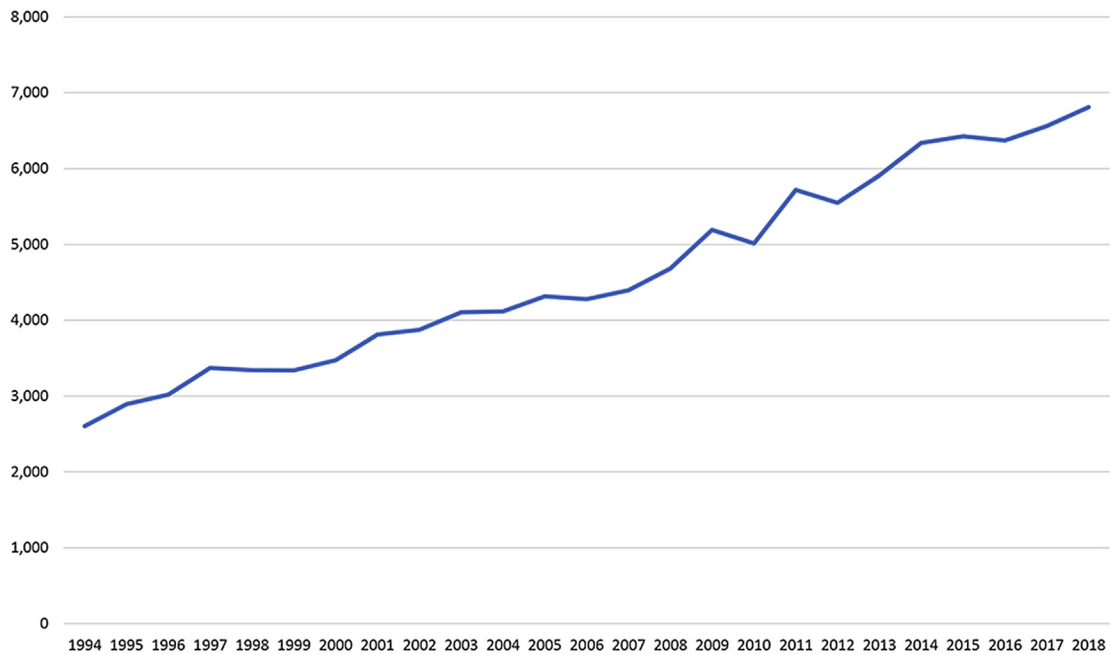


Figure 1. Suicides in Mexico in general population.

All these factors add up to a higher susceptibility of committing suicide. In the USA, 300−400 doctors kill themselves annually (17), which doubles the number of suicides reported for the general population. Aggregate suicide rate ratio for male physicians, compared to general population, was 1.41, and for female physicians it increased to 2.27 (18). It is common that healthcare professionals do not seek for professional help when these symptoms present (19).

Medical students additionally encounter high risk factors for anxiety/depression/suicidal ideation, such as a hierarchic organization and authority figures that contribute to student mistreatment or abuse, the need to combine laboral and academic responsibilities, long working periods (sometimes >100 h/week), poor dietary practices, academic variables such as competitiveness with classmates, academic overload, evaluations and time to complete schoolwork (12), personal traits such as neuroticism, introversion and low self-esteem, dissatisfaction with life, maladaptive behavior, substance abuse, and social factors such as starting a family and economic responsibilities or low social function scores (20−23). Preexisting mental health problems, repeater students, pregnancy, long trajectories and burnout also increase the risk (24,25). Previously, we reported that medical residents present passive coping strategies, which was associated to a greater risk of depression (26), and other authors have reported that type of specialty (urology, psychiatry, legal medicine), sex (male) and being single also increase the risk (27). Scholar consequences of anxiety and depression among students are diminished concentration, attention deficit disorder and academic failure. Psychosomatic symptoms have been found increased in students with anxiety and/or depression (28). Medical students have a higher risk of anxiety/depression and suicidal ideation than students in other careers (29).

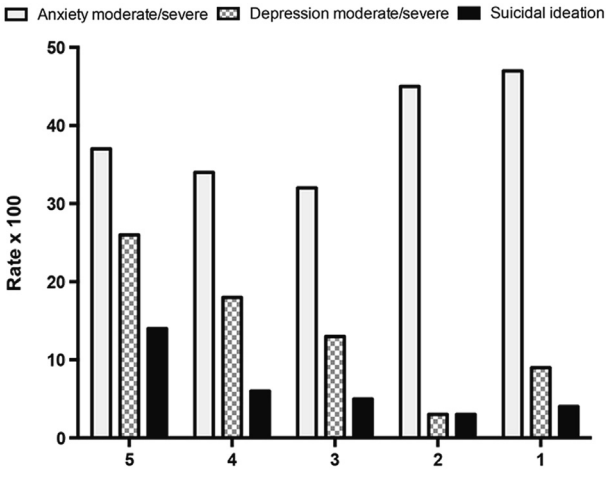
Multiple articles worldwide report a prevalence of anxiety/depression and/or suicidal ideation among medical students. Dyrbye et al, in the USA, report a 49.6% prevalence of burnout and a 11.2% suicidal ideation ($n = 2{,}248$) (30); Downs et al report that 8% of responders ($n = 1{,}008$) met criteria for high/significant suicidal risk (31); in Norway, Tyssen R, et al. (32) found that 14% of 522 students had suicidal thoughts, 8% planned it and 1.4% had attempted it. In the UK prevalence was 5.7−10.6% for preclinical and 2.7−8.2% for clinical phases (33). In Portugal, Coentre et al reported depression and suicidal behavior in 6.1 and 3.9% respectively ($n = 456$) (34), while recent meta-analysis report depression in 27.2−29.9% (35,36), and suicidal ideation ranging from 1.8−24.6% during medical school time. Less than 15% of them seek for professional help due to fear of stigmatization, confidentiality and the impact that this could have in their future careers.

This phenomenon has been less studied in Latin America. Barrios I, et al. (37) and Amarilla J, (38) report

Table 1. Prevalence of anxiety/depression and suicidal ideation in literature

				Anxiety		Depression		Suicidal risk	
Author	**Country**	**Year**	***n***	**(%)**	**Scale[a]**	**(%)**	**Scale**	**(%)**	**Scale**
Escobar-Padilla B,[b]	Mexico	2019	8,858 Interns	37.2	HAM-A	14.8	BDI	8.26	Plutchik
Tadeo-Alvarez M,		2018	203 Med Students			20.2	PHQ-9		
Martínez-Martínez MC,		2016	63 Med Students			31.72	PHQ-9		
Benjet C,		2016	4,189 Med Students			10.7	SITBI	9.7	C-SSRS
Jiménez-López JL,		2015	108 Residents	56.5	STAI	22.2	BDI	7.4	SRSP
Reyes-Carmona C,		2014	479 Interns	27.55	IDARE				
Guerrero-López JB,		2013	455 Med Students	53.8	STAI	39.3	CES-D		
Galván-Molina JF,		2012	323 Med Students	13	STAI	24	Zung/ Conde		
Romo-Nava F,		2018	1,068 Med Students			16.2	PHQ-9		
Romo-Nava F,		2013	1,871 Med Students			5.7	PHQ-9		
Melo-Carrillo A,		2012	1,958 Med Students			36.29	BDI		
Downs N,	USA	2014	1,008 Med Students	6.3	PHQ-9	8.9	PHQ-9	8.8	PHQ-9
Coentre R,	Portugal	2016	456 Med Students			6.1	BDI	3.9	Meehan and Lee
Tyssen R,	Norway	2001	522 Med Students					14	Paykel
Amarilla J,	Paraguay	2018	288 Med Students					54.9	BDI
Rotenstein LS,	Meta-analysis	2016	122,356 Med Students			27.2	various	11.1	various
Puthran R,	Meta-anaysis	2016	62,728 Med Students			28	various		various

[a]HAM-A Hamilton anxiety rating scale, BDI Beck Depression Inventory, PHQ-9 9 Item Patient Health Questionnaire, SITBI Self Injurious Thoughts and Behaviors Intervew, STAI State Trait Anxiety Inventory, IDARE Inventario de Ansiedad Rasgo y Estado, CES-D Center for Epidemiologic Studies Depression Scale, BSIS BeckSuicidal Ideation Scale.
[b]From authors Data Base at the IMSS.



Violence zone	Anxiety (moderate/severe)	Depression (moderate/severe)	Suicidal ideation	Total
	n = 3298	*n = 1324*	*n = 533*	
5 (high)	398	273	146	1064
4	1320	709	229	3840
3	560	230	90	1728
2	695	53	43	1541
1 (low)	325	59	25	685
Total				8,858

Figure 2. Prevalence rate for moderate-severe anxiety/depression and suicidal ideation according to zone of violence.

16.5% of anxiety, 23.1% of depression and 54.9% of suicidal ideation in 288 Paraguanian medical students. In Colombia, 15.7% of 963 medical students had suicidal ideation, and 5% had at least one attempt (39). In Brazil, depression has been found in 38.2% (40).

In Mexico, anxiety has been reported in 13–53.8% and depression in 3.5–39.3% of medical students (12,41–48). Depression was found to be related to increasing academic year (46) and during internship year. Only two reports were found with respect to suicidal ideation in Mexican medicine students (48,49). Benjet C, et al. (48) reported suicidal ideation in 9.7% of 4,189 undergraduate students form 6 universities (2 public and 4 private), and Jiménez-López JL, et al. (49) reported 7.4% in 108 specialization residents (surgery, anesthesiology, internal medicine, pathology and urology) (Table 1).

Medical internship is a compulsory requirement for undergraduate students in Latin America, where students acquire skills and knowledge that are necessary for a satisfactory performance in the core branches of medicine (primary care, pediatrics, gynecology and obstetrics, internal medicine, surgery and emergencies) by rotating in medical services. It represents a drastic change in which students stop being peripheral actors as they gradually gain direct responsibilities regarding the medical attention of patients in general practice. However, this process may have important implications on their psychological and emotional wellbeing.

Social violence has dramatically increased in our country, resembling war zone levels in some states (Figure 2). In 2018, the level of peace diminished 4.9%, mostly due to an increase in homicide levels by 14% (27 deaths per 100,000 inhabitants) (50,51).

In Mexico, our institution receives half of all the students in the country who carry out their pre-medical internship year, in 164 general hospitals and 492 primary care units distributed all over the country. During 2017, 18 interns resigned due to depression, 6 of whom attempted suicide. Ten of them lived in a highly violent zone, 7 in a medium violent zone and only one in low violent state.

This study aimed to determine the prevalence rates for anxiety/depression and suicidal ideation in this population, as well as the association of social factors, particularly social violence.

Method

We performed a cross-sectional study in three generations of medical students at entry of their internship year on July 2017 (n = 3212), January 2018 (n = 3278) and July 2018 (n = 2368). The protocol was approved by the National Research and Ethics Committee (R-2018-785-140), and all participants gave informed consent.

Students were invited and recruited during the first week at arrival, and voluntarily answered three validated screening scales in an electronic format to measure anxiety, depression and suicidal ideation. The Hamilton anxiety rating scale (HAM-A) was used to measure the presence and magnitude of anxiety and determine if the burden was low, moderate or severe. A validated translation to Spanish of Beck's depression inventory was applied to estimate the presence and degree of depressive symptoms classified in: no risk, low, moderate and severe. The Plutchik suicide risk test was included only for the two generations that started on 2018, which classifies as no risk and with risk.

Data was compiled and was analyzed by independent researchers who were not part of the information acquisition process. Severe cases were identified so that participants could receive proper psychological assistance, maintaining full confidentiality and guaranteeing their personal benefit.

Other variables that were recorded were gender, marital status (Single–includes divorced or widow; married–includes living together), type of university of origin (public or private), and violence rates of the geographical area where the hospital they were referred to do their internship was located (according to the Index of Peace Mexico 2018 Report) (50,51). This Index considers the following criteria: a) number of homicides, b) violent crimes, c) gun-related crimes, d) people in jail without sentence and e) organized crime.

Ethical Aspects Several strategies were followed during the design and implementation of this study to guarantee

that the principles and good practices of bioethics, established by the Helsinki Declaration of the World Medical Association in its different updates, as well as those established by the General Law of Health with regards to research and those demanded by the effective legal frame for the protection of personal data. In order to safeguard and promote the autonomy of participants, the process of informed consent was made by someone with no direct hierarchic relation with the student. With the purpose of fulfilling the principles of beneficence, vulnerability and justice in the distribution of risk and benefits, students who were identified with moderate or severe anxiety or depression symptoms, as well as those who displayed suicidal ideation, were sent for a specialized evaluation of their mental health to confirm the diagnosis and give them proper assistance.

Statistical analysis Normality tests were made for quantitative variables verified a parametric distribution; thus, the data was expressed in terms of means and standard deviations. Qualitative variables were described in terms of absolute frequencies and percentages. Depression and anxiety rates, as well as suicidal ideation, were analyzed by states and their prevalence was determined by dividing the amount of cases between the total population. χ^2 tests and odds ratio (OR) tests were used to determine association between independent variables and moderate/high depression/anxiety, as well as suicidal ideation. Mantel-Haenzel test was performed to adjust risk according to high violence (4−5 zones). We used the 20 version of the Statistical Package for the Social Sciences (SPSS) for MAC.

Results

All of the eligible students responded the HAM-A and Beck's depression inventory (n = 8,858), and 6,451 (72.8%) responded all three questionnaires. The mean age of the students was 23 (±1.2) years, from which 55.10% were female and 85.8% came from public universities. Most of them were single (97%).

For the whole group (n = 8,858), we observed moderate or severe symptoms of anxiety in 3,298 students, which account for 37.2% of all the participants, while 1,324 students presented moderate or severe symptoms of depression, which comprises 14.9% of the participants. Suicidal ideation, was present in 533 students, which represents 8.26% of the 6,451 interns that completed all three questionnaires (Table 2).

Prevalence rates for anxiety, depression and suicidal ideation according to zone of violence are shown in Figure 2. Prevalence rates for moderate/severe depression and suicidal ideation tend to increase in relation with an increase in social violence. Moderate/severe anxiety is highly prevalent in all groups.

Mexico has 32 states; five states corresponded to zone 5 (highly violent) (16% of all states), eight states represented zone 4 (25%), seven states were included in zone 3 (22%), seven for zone 2 (22%), and five states were in low violent zones (15%) (Figure 3).

Table 2. Description of population

	Number n = 8,858	Percentage
Gender		
Female	4,877	55.1
Male	3,981	44.9
Marital Status		
Single	8,588	97
Married	270	3
Type of University		
Public	7,596	85.8
Private	1,262	14.2
Violence rate of State of residence		
1 (Low violence)	685	7.7
2	1,541	17.4
3	1,728	19.5
4	3,840	43.35
5 (high violence)	1,064	12
Anxiety		
No anxiety	2,438	27.5
Low anxiety	3,122	35.2
Moderate anxiety	2,267	25.6
Severe anxiety	1,031	11.6
Depression		
None	6,271	70.9
Low depression	1,263	14.3
Moderate depression	898	10
Severe depression	426	4.8
Suicidal Ideation	(n = 6,451)	
Without risk	5,918	91.7
With risk	533	8.26

On bivariate analysis, female sex and private university associated significantly with anxiety or depression. High violence increased the risk for depression only. Female sex, high violence and severe anxiety or depression associated with suicidal ideation (Table 3).

In adjusted analysis, living in a highly violent zone increased the risk for anxiety/depression/suicidal risk for female students. Also, adjusted analysis increased the risk for suicidal ideation in single interns, and those with severe depression (Table 4).

Discussion

Anxiety occurs when an individual perceives daily situations as threatening, and reacts overweighing risks and minimizing his/her personal resources to confront them (42). Anxiety, if not properly treated, may lead to depression, which subsequently may increase suicidal risk. Suicide is a catastrophic event that affects not only the individual, but their families, and the society as a whole. While the suicide death rate is declining overall worldwide by 26%, suicide has been growing in Mexico during the last decade (16.6% increase from 2000−2012), particularly in females and young people (52).

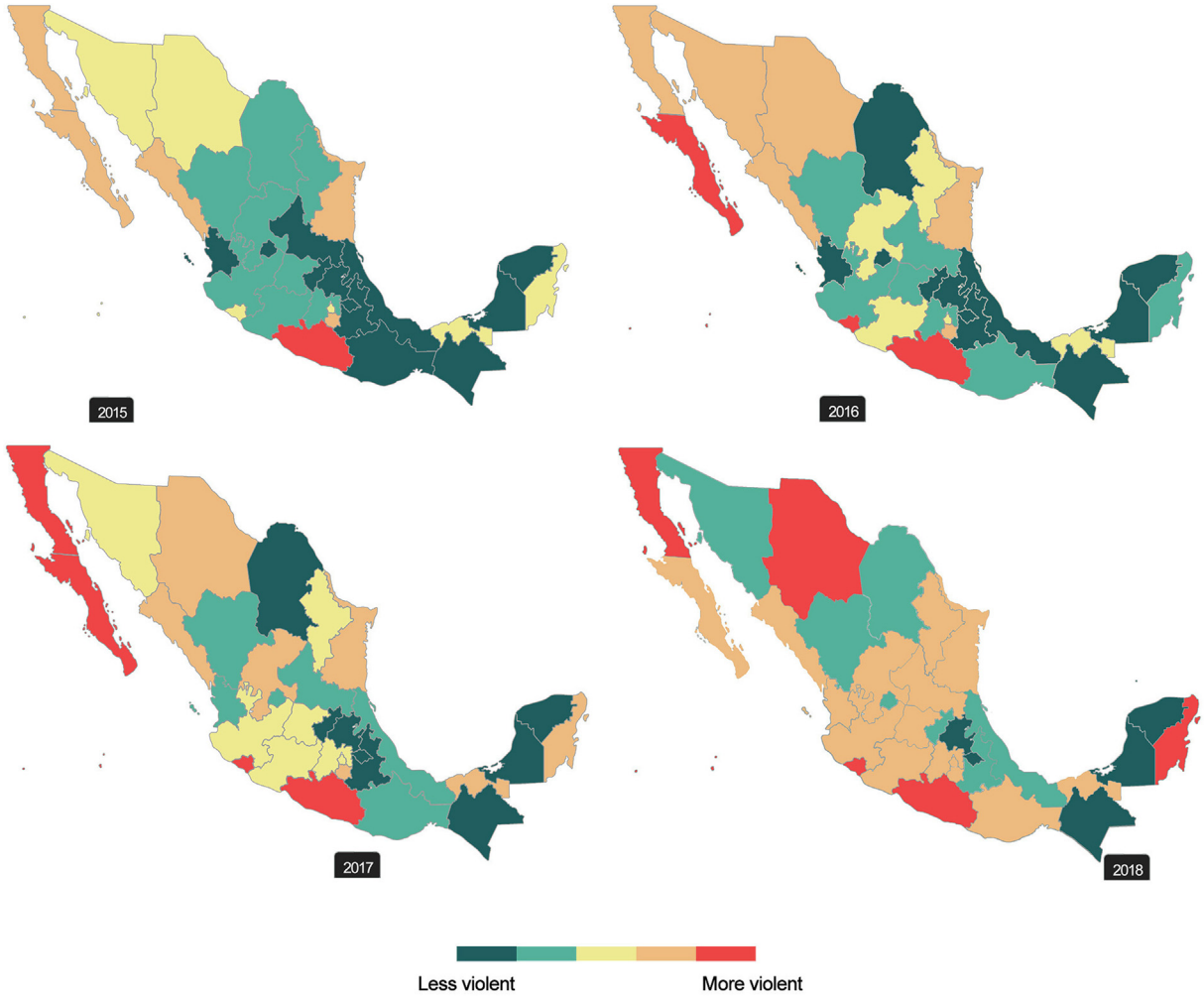


Figure 3. Peace Index in Mexico 2015–2018.

Psychopathology is also unfortunately increasingly prevalent in our societies, and young people have a higher risk of mental health problems. Early presentation of mental health disorders has important consequences in professional future. It is well known that healthcare professionals have an increased risk worldwide of anxiety/depression and/or suicidal ideation compared to general population.

As reported worldwide, our students presented a higher prevalence of anxiety and depression, compared to general population in the same age group. When compared with medical students, we found a lower prevalence (37.2%) of anxiety compared to other Mexican reports (53.8–56.5%) (43,49), but higher than that reported by Galván-Molina JF, et al. (13%), and was almost double than

Table 3. Odds ratio bivariate analysis

	Anxiety		Depression		Suicidal ideation	
	OR	CI	OR	CI	OR	CI
Female	1.2[a]	1.03–1.4	1.2[a]	1.1–1.7	1.2[a]	1.02–1.3
Single	1.05	0.8–1.3	1.1	0.6–2	1.08	0.6–1.8
Private	1.2[a]	1.1–1.7	1.2[a]	1.02–1.8	0.9	0.7–1.2
Highly violent residence area (I–II)	0.86	0.56–98	1.4[a]	1.2–1.7	1.5[a]	1.2–2
Anxiety severe					14[a]	11–39
Depression severe					45[a]	32–60

[a] $p \leq 0.05$.

Table 4. Adjusted odds ratio according to high violent state (violence zones 4−5)

	Anxiety		Depression		Suicidal ideation	
	Adjusted OR	CI	Adjusted OR	CI	Adjusted OR	CI
Female	2.1[a]	1.7−3	2.5[a]	1.5−5	2.3[a]	1.67
Single	1.2	0.8−4	1.7	0.2−6	1.3[a]	1.2−4
Private	1.3	0.9−2.3	2	0.7−12	0.9	0.5−2.3
Anxiety severe					5	0.7−12
Depression severe					57[a]	43−71

[a]$p \leq 0.05$.

that reported by Amarilla J, in Paraguay. With respect to depression, our results are higher than those of Romo-Nava F, in a sample of interns (46), and those reported in Portugal by Coentre, but resemble others reported by Mexican articles, and are lower than those in Paraguay (23.1%) (38), United States (46%) (30), or the meta-analysis reported by Rotenstein (27.2%) (35) or Puthran (28%) (36). Suicidal ideation rates were similar to those reported in other Mexican studies, and lower than those reported in international studies.

Differences in reported prevalences may be due to different social environments and socioeconomic conditions. Low economic status or perception of insufficient financial resources has been related to depression (9,12). Our students perceive a very low income (104 US dollars/month), and many of them must move to a different city for their internship year, which translates in greater living expenses, and this may be contributing to a higher prevalence of anxiety/depression. Furthermore, although the instruments we used have a good sensitivity, differences may be due to different measurement instruments used by other researchers, different reporting levels of anxiety/depression (low, moderate, severe) and different time periods. Fried (53), for example, identified a total of 52 specific disparate depression symptoms in 7 common depression scales, but the content overlap among questionnaires was low (only 12% appeared in all instruments).

In most reports, female students have a higher risk of anxiety/depression and suicidal risk, but for depression, the difference diminishes when severe cases are considered (47). Similar results have been described for anxiety, where the percentage of female students that manifested moderate or severe depression almost doubled the amount of male students (48). Suicidal ideation has also been reported to be higher in women students compared to men, with percentages of 11.7 and 7.9% respectively. Our findings confirm a higher proportion of female students with anxiety (60 vs. 40% male), depression (61.9 vs. 38.1%), and suicidal ideation (6.4 vs. 5.5%).

Other authors have found that divorced/separated/widowed persons have a greater risk of being depressed (13). Our results show that marital status was not significant, except for single students living in highly violent zones. Differences may be due to the fact that most of our students were single, and in that, for us, single meant having no stable partner, which includes divorced/widowed/separated students.

Depressive symptoms in medical students predict suicidal ideation on the following year (30). In the present study, we confirm a 14 fold higher suicidal ideation in persons with anxiety, and 45 fold in persons with depression, which increases to 57 for depression when adjusted to high violence.

Public university was found to be associated to anxiety and depression on bivariate analysis, but not when adjusting to high violence zone, but, again, these results may be biased by the fact that 85% of our sample came from public universities. We expected to have a higher prevalence in students coming from public universities because they are prone to have lower socioeconomic status, less familial support, and less mentoring programs as public universities usually have a much higher number of enrolled students, which make it difficult to follow students closely.

Violence has also been previously associated with depression, both in general and in healthcare populations, but the majority of research is associated to personal/domestic violence. The adverse psychological impact of wars has shown to have varied, lasting effects. Post-traumatic Stress Disorder is the most studied mental health outcome of this type of exposure. However, depression, anxiety, substance use disorders, increased risk for stress-related illnesses such as heart diseases and disability to function are frequent consequences in soldiers and military healthcare professionals (54).

Violence in Mexico has increased in the last decade, recently acknowledged as the country with the highest rates of homicides, escalating from 16.9 murders per 100,000 inhabitants in 2015−27.3 per 100,000 in 2018 (55). Healthcare professionals have directly suffered from social violence, as they are constantly threatened, extorted and abducted by delinquency. We hypothesized that this constant sense of insecurity (personal, financial, social) and exposure to life-threatening situations may be an important factor that contributes to depression, anxiety and suicidal ideation. Our results demonstrate that living in a violent zone associates significantly with depression and suicidal

ideation. Special attention must be placed on female, single and severely depressed students living in violent zones, since they have a greater risk for suicidal ideation. A confounding for these results is that we measured level of violence when arriving to their internship hospital, and many of them had a different place of residence in the past year, which may have influenced their level of anxiety/depression or suicidal ideation. Further studies must take this limitation into account.

Prevalence rates for moderate/severe depression and suicidal risk per 100 students shows a clear tendency to increase related to increasing violence, except for zone 1 (less violent) which shows greater prevalence rates for all three dependent variables compared to group 2. Anxiety showed a confusing behavior, being slightly more frequent in the low violence groups. This could be due to the fact that, for high violent zones, students may be progressing from anxiety to depression, while students in low violent areas do not progress to more severe affective disorders.

A strength of our study is the number of students and their nationwide distribution. Only 2 other studies report more than 8,000 students (56,57), and the fact that each studied generation represents the totality of students at IMSS and approximately 50% of the whole intern population in our country, ensures representability of our results. Furthermore, it represents students form 56 universities, which constitutes (65%) of all accredited medical schools in our country.

Although many reports coincide that anxiety/depression and suicidal ideation represent a problem for medicine students, only few strategies have been implemented in our country, and fragmented efforts have a low chance to succeed in promoting their wellbeing, their satisfaction towards the profession and their performance. More aggressive measures must be implemented as a policy in medical faculties and healthcare institutions to prevent, diagnose and treat anxiety and depression from a multidisciplinary team approach, and prevent chronic and fatal consequences. Young healthcare students must learn strategies to manage the uncertainty and difficulties of the profession, and their changing status in the healthcare system, but we must also rethink strategies to deliver Med Educ in a more effective and humanitarian way. The emotional wellbeing of the medical team should be considered as an important quality index. In sum, we must care for our caregivers.

The main weaknesses of this study are that self-applied surveys are susceptible to response bias, especially because participants may identify themselves as a vulnerable population, or may have not been fully sincere when answering the questionnaires causing a social desirability bias. Additionally, the three scales have screening purposes, so more specific tools are needed to confirm a more accurate diagnosis. Further studies must report confirmation of the diagnosis by a physician. Also, the cross sectional design of the study represents a single moment in time and may only infer association between variables, so further investigation must address the evolution of symptoms and their impact on their performance. Also, we did not evaluate comorbid psychiatric disorders or current antidepressant treatment.

Quantitative approaches may have various limitations when used to measure social and cultural aspects, as they fail to identify important information on the behavior of health institutions and learning environments. Therefore, qualitative and mixed studies may provide useful knowledge directed to the management of change.

This study was conducted at entry to our institution, and the acquired information raises the need of creating and implementing strategies that succeed to limit, control or diminish this problem, with special attention to high-risk States in which violence and a higher prevalence of mental health disorders was found. This article reports the initial diagnostic phase of a larger project that aims to use artificial intelligence systems to predict affective disorder risk in medical students.

Conclusions

Suicidal Ideation is High Among Premedical Interns in Mexico

Being female, coming from a private university and living in a highly violent zone significantly associated with moderate/severe anxiety and moderate/severe depression.

Suicidal risk was significantly associated with female sex, living in a highly violent zone, severe anxiety and severe depression.

Adjusted odds ratio confirmed an increased risk for female, single, severely anxious or depressed students living in highly violent zones.

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