Migration Letters

Volume: 21, No: S5 (2024), pp. 287-297

ISSN: 1741-8984 (Print) ISSN: 1741-8992 (Online)

www.migrationletters.com

Substance use, psychosocial vulnerability, and resilience: Trends and predictors 2000-2022 in high school and college populations

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Abstract

Trends in substance use and psychosocial vulnerability are presented in a population of high school and college students in the period 2000/2022, during which 7 representative samples of students obtained with random selection methods were studied. In 2022, the sample size was 399 for high school and 321 for college. A risk model is used that assumes that, although experimental consumption in student populations is not addictive consumption, it is a risk and an indicator of the level of stress that students are suffering. This model of cumulative risk and psychosocial stress has also led to the design of a resilience-based model of protection. The research instrument was the Inventory of Risk-Protection for Adolescents (IRPA-II), allowing the elaboration of a specific diagnosis of psychosocial risk profiles and resilience factors, which is self-applicable, anonymous, and with closed and recoded questions. Its current application is online. The results present predictive models on psychosocial vulnerability and consumption variables and multivariate models to measure resilience levels in different groups. Substance use trends have decreased in both populations for Alcohol Tobacco and marijuana. Risk groups defined as those who use substances and report high psychosocial vulnerability were 5.7% in high school and 9.3% in college students. Selective prevention measures and contents applied within the University's wellness programs are recommended, and recommendations of content and strategies for the implementation of such measures are detailed.

Introduction

Epidemiological studies of psychosocial risk in Mexico, including substance use among young university students, are documented in the literature (1) (2); however, there are practically no studies in Mexico that document trends in repeated cross-sectional measurements at the same university. This article shows trends in substance use and those of a predictive risk coefficient that uses substance use as a criterion variable and psychosocial vulnerability variables as independent predictor variables. In addition, in the samples of the last measurement carried out in 2022 among high school and college students, multivariate analyses were carried out to compare the resilience of 4 groups and multiple regression analyses to know the weight of psychosocial vulnerability variables in explaining substance use.

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These types of problems posed with multivariate comparative designs and predictive association designs allow to explain the phenomenon and provide feedback to youth programs focused on increasing student well-being and decreasing stress.

Throughout the research carried out by INEPAR, psychosocial risk, i.e. the phenomenon of substance use, sexuality management, lifestyles, and negative life events, has been defined as a cumulative risk phenomenon that is an indicator of psychosocial stress (3) (4) (5). Although experimental consumptions in university populations are not addictive consumptions. They are a risk and an indicator of the level of stress that students are suffering. Learning to manage stress healthily is one of the main actions of any program for adolescents and young people.

This risk model has also led to also design of a protection model based on resilience, since the measurements include a questionnaire that asks about psychosocial risk, but also about resilience, i.e. the internal and external protective factors that young people have to develop healthily. These protective factors are called resilience, a phenomenon that allows them to succeed in the face of adversity to move forward despite the difficulties. Currently, many intervention materials achieve the development of life skills in parents, teachers, and students (6) (7) (8) (9).

The hypotheses of the study to be resolved both in the sample of high school adolescents and in the sample of young university students are the differences in mean resilience scores between the groups formed by the variables of substance use and psychosocial vulnerability and the predictive capacity of 6 psychosocial vulnerability factors to explain substance use.

Psychosocial vulnerability was considered as the presence of stressful events in the last year of a young person's life in the areas of sexuality, lifestyle, negative life events, antisocial acts, health, and school factors. The 7 resilience factors considered in the multivariate analysis of the student groups were inner strength, self-esteem, family climate, ties with parents, ties with grandparents, support networks, and management of emotions and ties with grandparents.

Method

Subjects

The samples were calculated by experts from the University who reported the following (10)

The estimation and selection of the sample for the application of the IRPA instrument at the University for the fall 2022 semester was carried out as follows:

Originally, the sample size was determined with an n of 438 students, considering the following factors:

1.- Effect size of .05, as is conventionally done for social issues.

2.- Alpha of .05

3.- Sampling error of 2%.

Population of 11,136 students

5.- The selection was simply random

The conditions and adjustments necessary at the campus, given the contingency of COVID-19 and its variants, which include online classes for a large part of the student population, led to difficulties in obtaining responses from all the students in the sample. Given this situation and

to maintain the basic assumptions necessary for statistical inference, it was decided to privilege randomness and not to resort to convenience sampling, so the sample size was accepted with 320 students, complying with randomness and maintaining acceptable representativeness. The sampling error was modified from 2% to 2.35%.

It is considered that the power of the statistical tests designed for comparison of means allows comparison of the data of this period with those of previous studies carried out with the instrument in the population of the University.

The universe or professional population in the fall of 2022 was 11136 students and the original sample was 438, which was reduced to 320 due to the issues we have already discussed (this appears in the letter on the technical aspects of the sample). In the case of high school, the population or universe was 3548 and the sample was 405 students.

The estimation process for high school was the same as for the professional sample:

1. Effect size of .05, as is conventionally done for social issues.

2. Alpha of .05

3. Sampling error of 2%.

4. Population of 11,136 students

5. Te selection was simply random

Table 1
Samples 2000-2022

Higher Secondary Education	Male	Female	Higher Level	Male	Female
2000 n = 258	**45**	**54.7**	**2000 n = 620**	**42.1**	**57.1**
2004 n = 356	**41.3**	**58.4**	**2004 n = 638**	**42.6**	**56.9**
2007 n = 554	**42.8**	**56.9**	**2007 n = 525**	**38.5**	**61.5**
2011 n = 598	**44.8**	**55.2**	**2011 n = 558**	**45.5**	**54.1**
2015 n = 350	**45.4**	**54.3**	**2015 n = 339**	**43.1**	**56.6**
2018 n= 394	**43.1**	**56,9**	**2018 n = 430**	**38.1**	**61.9**
2022 n= 399	**42.9**	**57.1**	**2022 n=321**	**35.5**	**64.5**

In this last 2022 measurement, the online questionnaire was used in conjunction with the university measurement manager. Another innovation this year that may be related to the results obtained is that an analysis of post-pandemic psychosocial risks can be made since the last measurement before 2022 was in 2018 before the pandemic. To achieve comparability with previous studies and other similar studies that have been conducted in Mexico, this study maintained the methodology used concerning the questionnaire and the study sample that was obtained by the coordination department of the Learning Center with the same methods used in previous years.

As can be seen in Table 1, both in the high school and higher education samples, the proportions of men and women were conserved, with no significant differences between the lower and upper limits of the sample design.

Measuring instrument

The Risk-Protection Inventory for Adolescents (IRPA-II) provides a specific diagnosis of psychosocial risk profiles, useful for designing action plans, and preventive policies and evaluating the impact of interventions in each community or student sector. The "Substance use and antisocial behavior" section was developed based on questionnaires developed in collaboration with the WHO and the Addiction Research Foundation of Toronto, Canada. Since 1980 it has been used in national and local epidemiological studies, particularly in surveys conducted by the National Institute of Psychiatry "Ramón de la Fuente" and the Ministry of Public Education (SEP). The indicators were developed in the context of a WHO research and reporting program on the epidemiology of drug dependence. The studies conducted to develop and evaluate it were the first of their kind to examine the reliability and validity of questions related to drug use in a developing country (Mexico). The IRPA-II is self-applicable, anonymous, and with closed and pre-coded questions. It has a predictive capacity and can be used to obtain information on indicators that are considered basic for the establishment of preventive policies.

This instrument has been the same as the one applied since 2000, as far as the questions on psychosocial risk and drugs are concerned. (IRPA-II) was developed by INEPAR and is part of the Chimalli Strategies for the prevention of drug use and other psychosocial risks, it consists of 82 questions on risk behaviors and 26 questions on resilience (added to its 2005 version). It is aimed at student populations. The section on drugs and antisocial behavior was developed based on questionnaires developed in collaboration with the World Health Organization (WHO) and the Addiction Research Foundation of Toronto, Canada. Since 1980, it has been used in national epidemiological studies by the Ministry of Health (SSA) and the National Institute of Psychiatry, so that when applied to specific populations it offers local diagnoses for intervention that can be compared with national and/or state figures (11) (12) (13). The inventory has reliability and factorial validity studies that allow its use in preadolescent, adolescent, and youth populations. The psychosocial vulnerability section consists of the following areas: inadequate management of sexuality, antisocial acts, school performance, substance use in family and friends, health, lifestyles, and management of negative events. The substance use section asks about the consumption of 12 substances including alcohol and tobacco. The resilience scale consists of the following seven factors: Inner strength, Self-esteem, Family climate, Support network, Bonding with parents, Managing emotions, and Bonding with grandparents. In the application before 2022 in the last measurement of 2018, the alpha consistency coefficients were greater than .8' by the online application since in the 2018 application an alpha of .80 was obtained.

Results

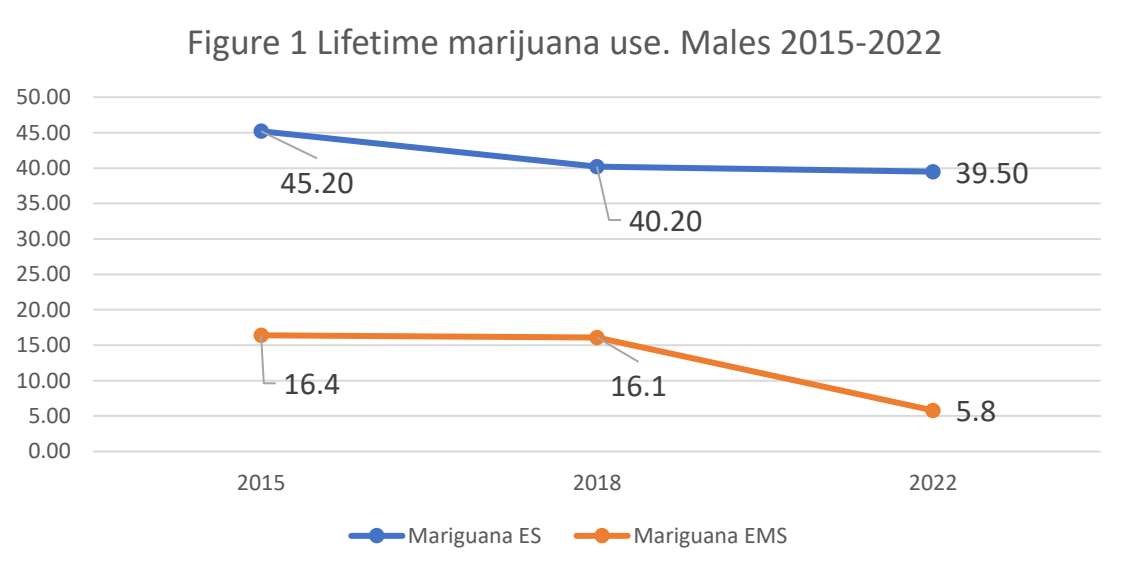
Trends in the prevalence of tobacco, alcohol, and marijuana

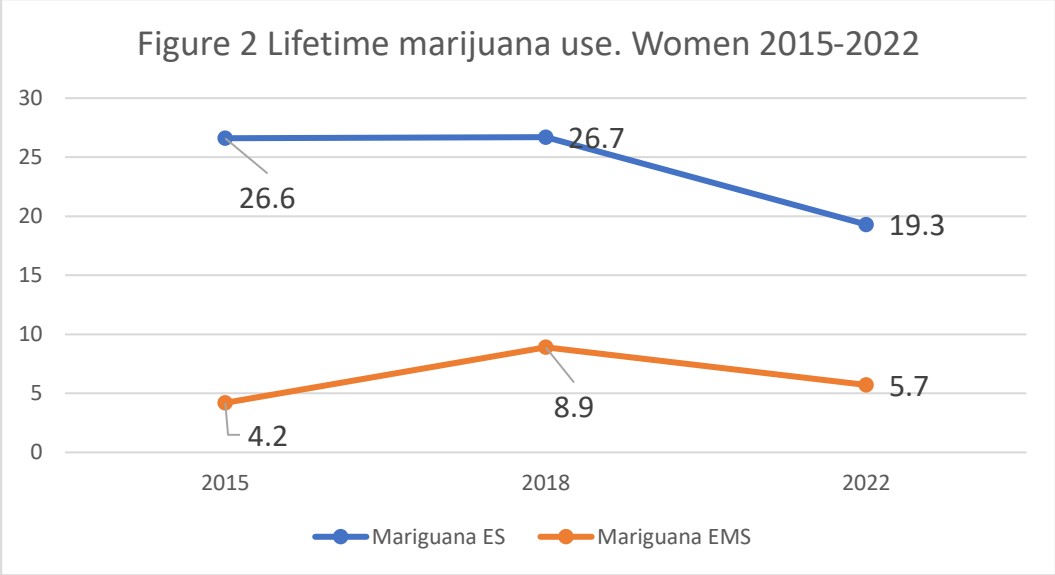
Table 2 Student respondents- Male and female 2015-2022

Students		Female	Male	Female	Male	2022 Female
Higher Education	H n=146	M n= 192	H n= 164	M n= 226	H n=114	M n =207
Higher Secondary Education	H n= 159	M n= 190	H n= 168	M n= 226	H n= 228	M n = 171

Figures 1 and 2 show the prevalence of marijuana use in men and women and the trends from 2015-2022. As can be seen, marijuana use decreased in the population of men and women in high school and higher education if we compare 2018 before the pandemic with 2022 after the pandemic. For college males, the prevalence decreased by less than one-tenth, but in high school, it decreased significantly, and in females, the prevalence of lifetime marijuana use decreased very significantly for both high school and college students.

Concerning alcohol and tobacco, the trends are presented in Figures 3 and 4. As can be seen, the prevalence of more than 11 cigarettes per day decreased to zero in the last 7 years, and concerning alcohol, which is the substance of greatest consumption among young people, the use of more than 4 drinks per occasion of consumption decreased very significantly among high school students.





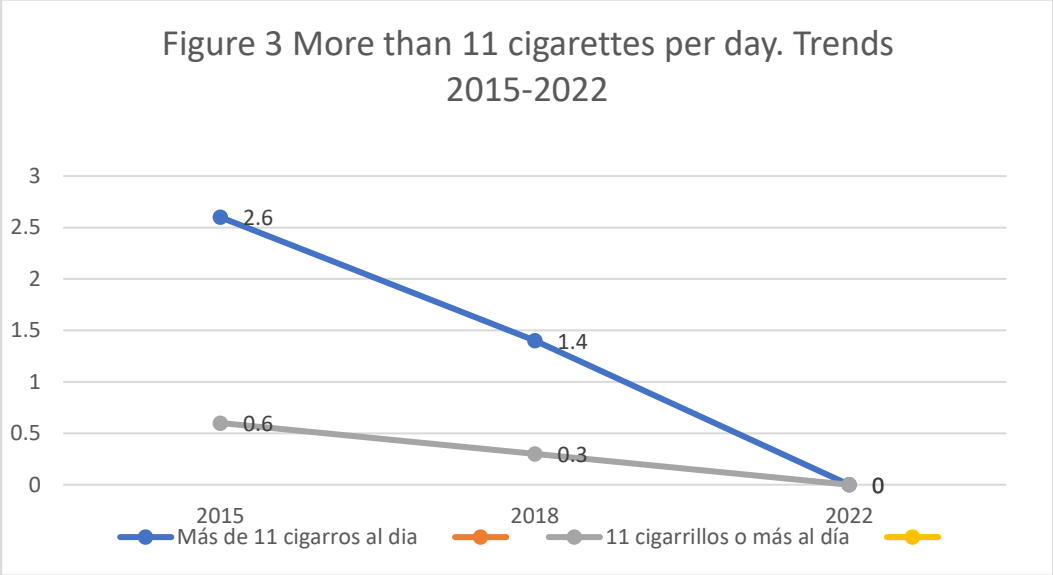
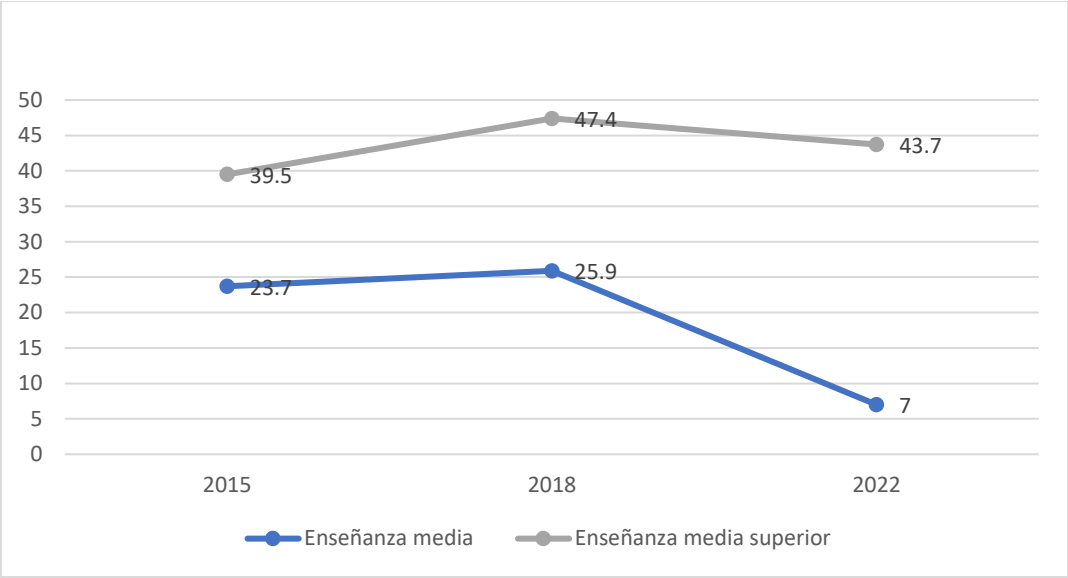


Figure 4 Consumption of 4 drinks or more by drinking occasion. Trend 2015-2023



Psychosocial Risk Coefficient

The psychosocial risk coefficient is a complex measure of a predictive model in which the criterion variable or dependent variable is the consumption of substances including alcohol and tobacco (Y) and the predictor or independent variables are 7 psychosocial vulnerability variables: x1 health, risk factors that have to do with reproductive and digestive diseases, trauma and accidents: consumption by family and friends, x2 sexuality: having unprotected sex, not having had sexual information, not using contraceptives, x3 employment, x4 school factors: failure, x5 antisocial acts, having sold drugs, taking part in brawls, forcing locks, x6 negative events: loss of a family member, moving house, difficulties with teachers, family or friends, x7 lifestyles: compulsive computer games, more than two nights of recreation per week (14).

Linear regression predictive model

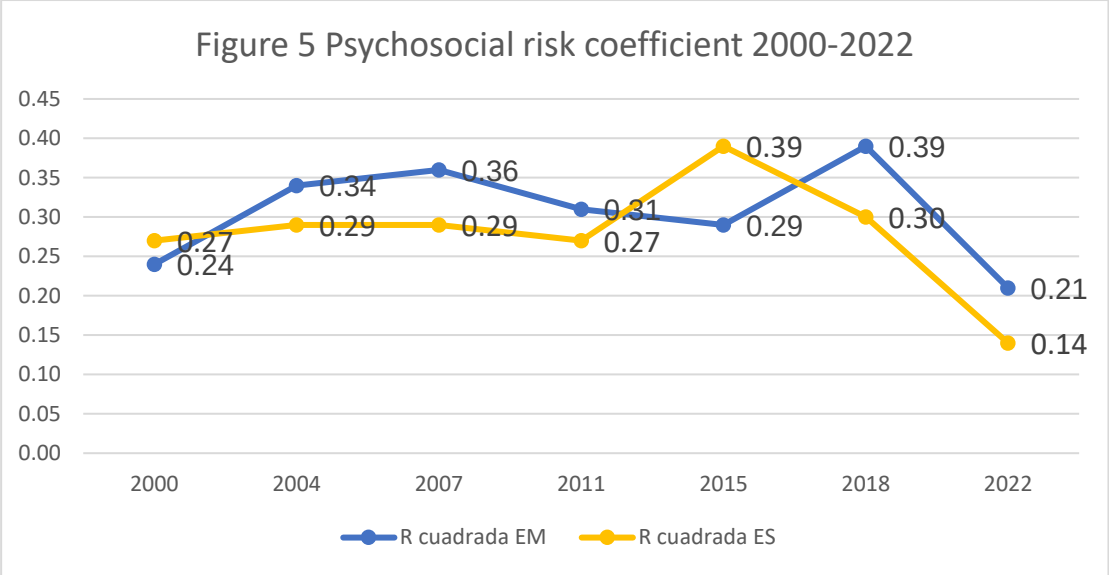
Y= x1+X2+X3+X4+X5+X6+X7

This risk coefficient, obtained through a predictive analysis of multiple linear regression, shows that the phenomenon of substance use, even when done experimentally, has a significant predictive association with variables of psychosocial vulnerability, which is the real risk phenomenon to be addressed, although the experimental use of substances is a risk for developing addiction, psychosocial vulnerability is even more so because of the multiple problems associated with the development of children, adolescents, and young university students. This is why following up on this complex measure provides significant information for preventive measures, especially in student populations.

Figure 1 shows the trends of this risk coefficient in the high school and college populations in a university in the interior of the republic.

As can be seen, the coefficients range from 0 to 1.00. in the years 2000 to 2022, most of the coefficients are located in the lower half of the risk thermometer, which is an indication to increase preventive measures to further reduce the magnitude of the coefficients. Concerning the trend, a very significant decrease in risk is observed, especially in comparison with the 2018

measurement, which indicates a decrease in the figures for substance use and psychosocial vulnerability.



Tables 3 and 4 present the statistics of the multiple regression analysis for EMS and ES students.

For the population of high school students, the risk coefficient is higher than for the university population, and of the 7 vulnerability variables, the ones that had a significant beta weight in the analysis were: antisocial acts, negative life events, lifestyles, and consumption in family and friends. While, for the population of young university students, the variables with the greatest weight were negative life events and sexuality.

Table 3 Multiple regression analysis. Substance use and psychosocial vulnerability in EMS.

	R multiple	R Square	GL residual	GL regression	F	NS	Beta weight corrected	t	NS
Upper secondary education n = 399	0.48	0.21	351	7	14.8	0.00			
Antisocial acts							0.9	1.9	.05
Negative life events							0..32	5.3	0.00
Lifestyle							0..18	3.5	0.00
Consumption by family and friends							0.9	1.9	.05

Table 4 Multiple regression analysis of substance use and psychosocial vulnerability in HE									
Higher education n= 321	R	R Square	GL Residual	GL regression	F	NS	Beta weight corrected	T Test	NS
	0.40	0.14	310	7	10.43	0			
Negative life events							0.20	3.0	.002
Sexuality							0.13	2.0	.04

Tables 5 and 6 show the general multivariate model in the groups of students who reported using a substance and those who reported not using and in the high and low vulnerability groups in both high school and higher education, for each of the 7 resilience variables considered as dependent variables: inner strength, self-esteem, family climate, support networks, emotion management, bonding with parents, bonding with grandparents, and so on.

It is observed that for the high school population considered in 2022, the 7 resilience variables were significant, being the group of consumers with high vulnerability who obtained significantly lower mean resilience compared to the other groups.

The higher education students have a different model where only 3 resilience variables were significantly different in the groups, obtaining a significantly lower mean of resilience in inner strength, support networks, and family climate in the group that reported using substances and having low vulnerability.

Considering as groups at risk those students who report high consumption and high vulnerability, then the 23 high school students who belong to this group represent 5.7% of the population and the 30 college students who belong to this group represent 9.3% of the population.

Table 5 General Resilience Model for high school students n=399

Variable	Mean 1 n= 280	Mean 2 n = 78	Mean 3 n= 18	Mean 4 n= 23	F	GL	NS
	No consumption and low vulnerability	No consumption and high vulnerability	Consumption and low vulnerability	Consumption and high vulnerability			
Inner Strength	21.50	20.10	20.50	18.30	7.6	3	0.00
Self-esteem	21.70	20.40	20.8	17.8	8.7	3	0.00
Family climate	18.80	17.23	18	15.6	18.9	3	0.00
Support network	17.80	16.50	17.70	15.50	9.80	3	0.00
Bonding with parents	8.50	7.70	7.8	7.1	6.2	3	0.00
Emotional management	13.30	12.90	13.00	12.10	3.30	3	0.02
Bonding with grandparents	11.40	12.90	9.8	9.7	4.7	3	0.03

Table 6 General Model of Resilience in Higher Education Students n= 321

.	Mean 1 n = 192	Mean 2 n= 24	Mean 3 n = 75	Mean 4 n= 30	F	NS
	No consumption and low vulnerability	No consumption and high vulnerability	Consumption and low vulnerability	Consumption and high vulnerability		
Inner strength	21.5	20.4	21.3	20	2.6	0.04
Family climate	18.6	17.7	18.6	17.5	3.6	0.01
Support network	18.1	17.4	18.1	16.6	4.6	0.004

Conclusions

This research shows how the experimental use of substances such as marijuana, alcohol, and tobacco has decreased significantly, especially tobacco abuse. The population that showed the most marked differences in these consumptions was the high school population, although there was a decrease in 2018 in the consumption of marijuana in high school students, compared to 2015 there is still an increase in this consumption.

The risk levels defined as groups that consume substances with high psychosocial vulnerability, 5.7% in high school and 9.3% in university students, are groups that need to be addressed within the policies of programs in charge of bringing wellbeing to the population at risk that are also directed to the general population. Selective prevention aimed at red hot spots but applied to the entire population, in order not to stigmatize these at-risk groups, especially when we know that preventive interventions for at-risk groups aimed at increasing resilience and, as far as possible, strengthening the school and family environment are measures that can and should be applied to the entire population. It is known that the categories of low, medium, and high psychosocial risk are highly permeable depending on the typical developmental transformations of young people and adolescents and the variations in the family, school, and community environment (14)

The strategy of content development by groups of experts based on the findings of this study and the training of young facilitators from the same student population to disseminate this content among their peers to build prevention networks in favor of wellness is recommended. It is also recommended that these contents be videos and messages that can be mounted online, which have been very successful in university environments (1).

For the intervention model for high school students, content is recommended to address psychosocial vulnerability concerning antisocial acts, negative life events, and risky lifestyles, as well as drug use in family and friends through programs that help identify negative and positive emotions, which is essential for developing emotional intelligence. For adolescents, recognizing and understanding their emotions allows them to manage them healthily and respond appropriately to situations. Also recognizing that their peers separate themselves from their mistakes is essential to foster an accepting and supportive environment and increase their self-esteem. This promotes a compassionate attitude and reduces fear of judgment and shame.

The model of resilience in young university students, and its most important risk factors to explain substance use, the management of negative life events and behaviors around their sexual life, highlights the importance of support networks, i.e., being satisfied with the daily

treatment of peers. Feeling valued and respected by peers in the university environment contributes to a positive and motivating work climate. This fosters collaboration and productivity. Also very important in this area is inner strength, which is a gradual and personal process. Practicing gratitude and positivity, i.e., cultivating a mindset of gratitude and focusing on the positive aspects of life, strengthens the inner world. Students can develop the habit of recognizing and appreciating the good things, practicing daily gratitude, and challenging negative thoughts by seeking more optimistic perspectives.

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