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The Importance of Culturally informed, Evidence-based Intervention: Laying the Groundwork for Comprehensive Suicide Prevention in Mexico

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Suicide is an urgent public health problem worldwide. Although suicide rates in the Americas are close to the global average (9.2 per 100,000 individuals), it is the only world region that has seen an increase in suicide rates in recent years (World Health Organization [WHO], 2025). For this reason, comprehensive, evidence-based strategies to prevent suicide are urgently needed in countries across the Americas. The WHO's LIVE LIFE Implementation Guide for Suicide Prevention in Countries lists four key population-level, evidence-based strategies to lower suicide risk: "Limit access to the means of suicide; Interact with the media for responsible reporting of suicide; Foster socio-emotional life skills in adolescents; Early identify, assess, manage and follow up anyone who is affected by suicidal behaviours" (WHO, 2025). Broad implementation of just the first of these recommendations (means restriction) would prevent approximately 10,000 and 110,000 suicide deaths in males and females respectively over a decade (Lange et al., 2024).

This issue of *Salud Mental* presents a series of articles that collectively provide a context of youth mental health and suicide in Mexico, including the evaluation of specific promising interventions. Three of them correspond to the results of the research project titled "Educational Interventions for the Prevention of Suicidal Behavior in Adolescents in Mexico" (Arenas-Monreal et al., 2025, Fuentes et al., 2025 and Hermosillo et al., 2025).

Méndez & León (2025) identify a high prevalence of symptoms of anxiety, depression, and suicidal thoughts and behavior among university students. Suicidal thoughts, planning, and/or suicide attempts were reported by three out of ten females and two out of ten males, indicating a high, concerning burden. Hermosillo et al., 2025 conducted a multi-informant study of adolescents at a Mexico City clinic that yielded marked suicide-related sex differences. Among clinical adolescents, the prevalence of suicidal ideation and/or attempts was higher in males than females (41% vs. 33%). As expected, suicide-related outcomes correlated with psychopathology and psychopathology differed between the sexes. In keeping with previous findings (Chaplin & Aldao, 2013), females had higher levels of internalizing symptoms (such as depression and anxiety) whereas males had higher levels of externalizing factors (such as impulsivity and aggression). Females also reported more neurodevelopmental difficulties (such as cognitive deficits and social communication problems) and psychotic symptoms. Collectively, these findings point to the urgent need for efforts to address suicide and its antecedents in Mexico. Although population level sex differences exist, individual variations occur, and it is important to avoid an ecological fallacy. For example, some Mexican females had externalizing symptoms, while some males had internalizing symptoms. These symptoms confer risk, and warrant attention. The optimal approach would therefore include a combination of broad-based universal intervention for all youth and more selective intervention for specific at-risk groups (such as female adolescents with internalizing symptoms).

Arenas-Monreal et al., 2025 provide crucial data to inform universal programs for life skills. Their focus groups with middle schoolers identified three potential targets of intervention. Students expressed 1) a wish for more agency and shared decision-making with parents and teachers; 2) a desire for more assistance in problem-solving and

conflict resolution (including tools beyond quid pro quo negotiation ("giving a bribe")); 3) hope for assistance with managing emotions such as anger and sadness, particularly in the context of challenging social circumstances (such as domestic violence). These findings provide a potentially useful roadmap for key targets of skills-based interventions for youth transitioning to adolescence. Notably, the authors also found that knowledge of suicide often occurred through peer-to-peer transmission. Interventions exist to address transmission (Pirkis, Bantjes, Gould, et al., 2024), and could be implemented at schools in Mexico.

The two last papers investigated the utility of specific interventions to address at-risk youth. Hermosillo et al., 2025 studied a dialectical behavioral therapy program for adolescents in Mexico (DBT-MXAU) (Hermosillo et al., 2025) given the promising evidence for DBT among suicide prevention therapies (Witt et al., 2020). DBT-MXAU had a medium effect size for reducing suicide risk measures, as well as enhancing emotional intelligence. Those with the highest suicide risk reported greater use of DBT skills.

Fuentes et al., 2025 examined an online intervention for Mexican high schoolers aimed at improving their knowledge of the impact of psychoactive drugs and life skills to protect against use. Although the researchers did not directly measure its impact on substance use, their results were promising. Those who received the intervention reported greater awareness of harms and displayed markers of potentially healthy future decision-making (such as resistance to peer pressure). Although the intervention does not directly address suicide, it is nevertheless potentially important for suicide prevention given the evidence that addressing substance use, particularly alcohol use, is a key target of population-based efforts (Pirkis, Bantjes, Dandona, et al., 2024).

Collectively, the above studies help lay the groundwork for more comprehensive, culturally informed suicide prevention in Mexico. In recent years, Mexico created a national suicide prevention program (PRONAPS) to address suicide and its antecedents through intersectoral action (Vazquez et al., 2024). This was an important step towards creating a Mexican National Suicide Prevention Strategy (NSPS). NSPSs are complex, multilevel, multicomponent targeted efforts using a whole-of-government approach to address the epidemiological, socioeconomic, cultural, ethical, legal, and political factors impacting suicide deaths in a country (Platt et al., 2019; Schlichthorst et al., 2023; Sinyor et al., 2024; WHO, 2025). There is some evidence of an overall positive impact of NSPSs on suicide deaths provided they are well-structured and grounded in evidence-based interventions, although most evidence comes from high-income countries like Finland (Platt et al., 2019).

In addition to the four key population-based interventions proposed by the WHO, NSPSs also often include awareness actions/campaigns, postvention, crisis intervention, surveillance and monitoring, and access to social and health services (Sinyor et al., 2024). To be effective, NSPSs and their components must address and respond to particular cultures and contexts, acknowledging how social determinants of health such as cultural, political, economic, social, clinical factors may impact their implementation (Pirkis et al., 2023). The findings from these studies indicate that Mexican youth are at an elevated risk for suicide but that targeted interventions may effectively mitigate this risk. Implementation remains a major limitation in countries worldwide, including Mexico. Mexico and other Latin American countries face political instability, low healthcare investment (including mental health), and limited research capacity and investment. These challenges hinder the implementation and evaluation of suicide prevention efforts. Yet there is hope! This issue of *Salud Mental* shows that Mexico produces high quality research. It can and should be built upon to devise and implement efforts and, hopefully, a comprehensive NSPS that will safeguard the wellbeing of Mexican youth.

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Effectiveness of an Online Intervention to Prevent Psychoactive Drug Use by Expanding Knowledge of its Effects, Enhancing Life Skills and Increasing Risk Perception Designed for Mexican Middle School Students

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ABSTRACT

Introduction. Adolescence is a vulnerable stage, but also a key time to prevent risky behaviors like drug use. It is important to address risk factors that can become protective factors by enhancing life skills (LS) and increasing the risk perception of psychoactive drug use. **Objective.** To evaluate the effectiveness of an online intervention to increase knowledge of the effects of psychoactive drug use, improve LS, and increase the risk perception of psychoactive drug use among Mexican middle school students. **Method.** A quasi-experimental, pretest-posttest study with middle school students using an online version of the intervention. **Results.** A comparison of the scores of the experimental and control groups on the post-test yielded significant differences in knowledge of the effects of tobacco, marijuana, alcohol, and ecstasy use, and in planning for the future, assertiveness, decision-making, and taking responsibility. It also revealed differences in the perceived risk of marijuana, inhalants, alcohol, and tobacco use. **Discussion and conclusion.** The results show that this online intervention modifies middle school students' risk perception of psychoactive drug use, increases knowledge of its effects, and improves LS. Its online design reduces implementation costs and increases the likelihood of its use as a psychosocial tool to prevent psychoactive drug use.

Keywords: Prevention, substance use, life skills, risk perception, adolescents.

RESUMEN

Introducción. La adolescencia es un periodo de vulnerabilidad y una etapa oportuna para la prevención de comportamientos de riesgo como el consumo de drogas. Es importante profundizar en factores de riesgo que pueden convertirse en factores de protección como el fortalecimiento de habilidades para la vida (HPV) y el aumento de la percepción de riesgo hacia el uso de drogas. **Objetivo.** Evaluar la efectividad de una intervención preventiva en línea para aumentar el conocimiento sobre los efectos del consumo de drogas, fortalecer las habilidades para la vida y aumentar la percepción de riesgo del consumo en estudiantes mexicanos de secundaria. **Método.** Estudio cuasiexperimental pretest - post test, con alumnos de secundaria, utilizando una versión en línea de la intervención. **Resultados.** En la comparación de los puntajes de los grupos experimental y control en el post test, hubo diferencias significativas en el conocimiento de los efectos del consumo de tabaco, marihuana, alcohol y éxtasis y en los puntajes de las habilidades de planeación a futuro, asertividad, toma de decisiones y toma de responsabilidades. También hubo diferencias en la percepción de riesgo del consumo de marihuana, inhalables, alcohol y tabaco. **Discusión y conclusión.** Los resultados muestran que esta intervención en línea ha probado su efectividad para modificar la percepción de riesgo hacia el consumo de drogas, aumentar el conocimiento sobre sus efectos y fortalecer HPV en estudiantes de nivel secundaria. Su diseño en línea reduce costos de implementación y aumenta la probabilidad de utilización como una herramienta psicosocial para prevenir el consumo de drogas.

Palabras clave: Prevención, uso de sustancias, habilidades para la vida, percepción de riesgo, adolescentes.

INTRODUCTION

The World Drug Report 2023 shows that use remains high, with the estimated number of users increasing from 240 million in 2011 to 296 million in 2021. This year, one in 17 people aged 15 to 64 used a psychoactive drug in the past year. Globally, adolescents and young adults have the highest usage rates, influenced by cultural, economic, and social factors, with variations across countries, ages, and genders (United Nations Office on Drugs and Crime [UNODC], 2023). Psychoactive drug use rates among Mexican adolescents aged 12 to17 have varied. For example, the prevalence of tobacco use was 22.2% in 2012 and 22.8% in 2017; the prevalence of alcohol use was 42.9% in 2012 and 39.8% in 2017, while the percentage of those who have used marijuana was 2.4% in 2012 and 5.3% in 2017 (Instituto Nacional de Psiquiatría Ramón de la Fuente Muñiz [INPRFM] et al., 2012, 2017). The data indicate that the median age of first use of psychoactive drugs among Mexican adolescents is falling, the accessibility of drugs is increasing, and there is a low risk perception of drug use (INPRFM et al., 2012, 2017). These factors increase psychoactive drug use, negatively impacting the lives of this population. Adolescents are more vulnerable to developing addiction, which has significant public health implications (Crews et al., 2007; World Health Organization [WHO], 2017).

Adolescence involves major biological, psychological, and social transitions, leading to rapid physical, psychological, sexual, and social transformations. These modifications in the brain, cognition, and emotions can mean periods of instability and vulnerability, as well as requiring adolescents to adapt to changing social contexts (WHO, 2018).

The interplay between risk and protective factors at this stage determines the levels of vulnerability in which certain risk behaviors can emerge or consolidate, such as psychoactive drug use (UNODC, 2021), which is a major public health problem. Individual, familial and social risk factors that increase the likelihood of drug use include interest in experimentation, curiosity, rebelliousness, impulsivity, low self-esteem (Lee et al., 2018), lack of emotional regulation, limited social skills, depression, anxiety, behavioral problems, poor school performance, previous experiences of use, low risk perception of psychoactive substance use, and problems with one's parents (Gonzálvez et al., 2014; Larsman et al., 2012; Lee et al., 2018; National Institute on Drug Abuse [NIDA], 2020; Nawi et al., 2021; Whitesell et al., 2013).

The World Health Organization Guidelines on Adolescent Mental Health Promotion and Prevention Interventions recommend the implementation of universal psychosocial interventions targeting all adolescents to promote good mental health and prevent risk behaviors such as the use of psychoactive substances (WHO, 2020). Adolescence is an ideal time for prevention and intervention, due to the neuroplasticity of the adolescent brain and the possibility of intervening at the time of onset of risk behaviors such as psychoactive substance use and most mental health problems. In this context, two protective factors are the enhancement of life skills (LS) and a higher awareness of the risks associated with psychoactive drug use.

The health protection and risk behavior prevention approach, based on the LS model, defines these factors as positive adaptive behavioral psychosocial skills enabling adolescents to cope effectively with the demands and challenges of everyday life (WHO, 2003, 2020). This approach considers the evidence for the role of cognitive, interpersonal, and coping skills in adolescent psychosocial development; the effect of skills on young people's ability to protect their health, adopt positive behaviors, and foster healthy relationships; the applicability of skills to both health and social issues (such as education, violence, and human rights); and the reinforcement of protective factors to promote adolescents' self-confidence, self-efficacy, self-esteem, and well-being (Ross et al., 2020; United Nations Children's Fund [UNICEF], 2020; WHO, 2020). These interventions should focus on social and emotional learning, incorporating interpersonal and coping skills such as problem-solving, assertiveness, stress management, and emotional regulation (WHO, 2018, 2020, 2021).

The LS approach has been identified as an effective component of interventions focused on promoting mental health and preventing risk behaviors during adolescence (Skeen et al., 2019). Programs have proven effective in preventing early drug use (Botvin & Griffin, 2014) across settings (Tremblay et al., 2020), while LS have been identified as protective factors for adolescents (Velasco et al. 2017).

Universal prevention and early intervention programs based on LS to address psychoactive drug use in school settings have been implemented in several countries. They have shown excellent results because they are easily accessible to adolescents and conducted in appropriate spaces to promote learning and socialization (Sanchez et al., 2019; Weichold & Blumenthal, 2016). The international literature contains examples of the use of mobile applications to prevent or treat the use of psychoactive drugs, such as tobacco, alcohol, and methamphetamines among adolescents. These apps offer a range of features, including information and education, advice, strategies, and LS training, together with screening instruments for use. However, further research is required to assess their effectiveness (Birrell et al., 2018, 2021; Chapman et al., 2018; Giroux et al., 2017; Haug et al., 2021, 2023; Thornton et al., 2017).

Given that risk perception involves the evaluation of an object based on its favorable and unfavorable attributes, risk perception levels have been considered key determinants for addressing risky behaviors such as drug use. Since the likelihood of drug use increases when people perceive

little or no risk of harm associated with it, higher perceived risk can be considered a protective factor against psychoactive drug use (Florimbio et al., 2024).

Preventive interventions developed online and available on the Internet with research-based approaches have the advantage of accessibility, interactivity, ease of use, greater potential scope, and lower implementation costs compared to face-to-face interventions. They reach the adolescent population because young people are familiar with them, easily incorporating them into their lifestyle (Haug et al., 2017; Schwinn et al., 2018). The "What Happens if you Go Too Far?" intervention shares these characteristics and has been shown to be effective in increasing risk perception regarding psychoactive drug use among middle school students. The intervention, designed to enhance LS and increase risk perception, is based on the WHO Skills for Health model and Bandura's Social Learning Theory and operates at the cognitive and behavioral levels. The former, containing evidence-based scientific information, uses textual and visual language to facilitate understanding and encourage critical thinking regarding drug use. At the behavioral level, it enhances LS, improving adolescents' ability to relate to their peers, resist peer pressure to use drugs, effectively solve problems, and make responsible decisions while being aware of the consequences (Fuentes et al., 2023).

This study aims to evaluate the effectiveness of an online preventive intervention to increase knowledge of the effects of psychoactive drug use, enhance life skills, and increase risk perception of drug use among Mexican middle school students.

METHOD

Study design

A quasi-experimental pretest-post-test study was conducted. Measurements were taken at baseline and at the end of the intervention.

Participants

Two groups of third-year middle school students from a public school in the Mexican state of Querétaro were obtained through non-probabilistic convenience sampling. All the students enrolled in the same class were assigned to one of the two study groups.

A total of 73 students (65.8% female and 34.2% male), aged 13 to 15 (mean = 13.90; *SD* = .37), participated in the pretest. Sixty-nine students (63.8% female and 36.2% male) aged 13 to 15 (Median age = 13.99; *SD* = .27) participated in the post-test.

Measurements

A pre- and post-intervention questionnaire was administered using a Google form, which students completed individually using a PC. The questionnaire took approximately 50 minutes to complete, and the response rate was 100%.The pretest measurement was taken before the first session, and the posttest measurement at the end of the last session. The questionnaire included the following sections:

Sociodemographic. Questions on the sex, age, and place of residence of the participants.

Drug use. The ASSIST questionnaire was used to measure psychoactive drug use (WHO, 2010) and included the following item: "Have you ever used tobacco, alcohol, marijuana, cocaine, ecstasy, or inhalant drugs?" The responses for each drug were dichotomous.

Knowledge of drugs. The study measured participants' knowledge of tobacco, alcohol, marijuana, inhalants, and cocaine. This was accomplished through a questionnaire inquiring about the effects and consequences of the use of these drugs. Each question was answered on a Likert-type scale: "always" = 4, "nearly always" = 3, "sometimes" = 2, and "never" = 1. Higher scores indicated greater knowledge of drugs.

Life Skills. LS were measured with the Brief Life Skills Scale for Adolescents (EHV-A), developed using 24 items from several longer scales that assess the skills separately and have been validated for Mexican adolescents (Fuentes et al., 2023). The skills included were planning for the future (three items), assertiveness (three items), expression of emotions (three items), resistance to peer pressure (six items), decision making (six items), and taking responsibility (three items). A Likert-type scale was used with the following options: "never" =1, "sometimes" = 2, "nearly always" = 3, and "always" = 4. The score for each LS was the sum of the individual scores. The higher the score, the greater the presence of the skill being measured.

Risk perception. Risk perception of psychoactive drug use was measured using a questionnaire inquiring about the perceived danger of drug use (INPRFM et al., 2017). The questionnaire employed a Likert-type scale: "not dangerous" = 1 "dangerous" = 2, and "very dangerous" = 3, with higher scores indicating a greater perception of risk.

Procedure

Health sector personnel were trained to administer the intervention before implementing it. This training was facilitated by guidelines designed to replicate the three components for each of the drugs considered in the contents of the App. Training included modules on the effects and risks of psychoactive drug use among adolescents and enhancing life skills.

The comparison groups were not randomly assigned and instead natural groups were used since the sampling

was convenience based. These were homologous in all variables except for the expression of emotion and taking responsibility.

The "What Happens if you Go Too Far?" intervention was replicated from October to December 2023 with third grade students at a public middle school in the city of Querétaro, in the state of Querétaro, Mexico. A Web version of the intervention was used to facilitate access to the intervention through PCs available at the school. The content of the intervention was only available online. Every student was assigned a computer with a previously trained health professional in each group to administer the intervention, who served as a facilitator.

The intervention was conducted during the weeks determined by the school. Prior permission was obtained from the school administration to provide access and the facilities required to implement the intervention once the objectives of the study had been explained. Students in both groups were informed of the risks and benefits of participating in the study on a voluntary basis and were assured that their responses would be anonymous and that the results would not affect their school activities or evaluations.

The intervention took place during school hours in ten one-hour sessions. Topics covered in the sessions included tobacco, alcohol and males, alcohol and females, marijuana, cocaine, ecstasy, and inhalants. Each topic covered the following intervention components: 1) knowledge of the risks and consequences of drug use, 2) life skills, and 3) risk situations associated with drug use. The intervention incorporated interactive resources, including comics, trivia, and the ASSIST questionnaire, to assess the risk of drug use.

Statistical analysis

Data analyses were performed with SPSS (version 21).

The Wilcoxon test was used to compare scores in knowledge of the consequences of psychoactive drug use, life skills, and risk perception before and after the intervention within each group.

The Mann-Whitney U test was used to compare scores on knowledge of the consequences of drug use and life skills between the experimental and control groups.

Ethical considerations

All parents of the participants provided written informed consent, and all participants provided written informed assent. The Research Ethics Committee of the Instituto Nacional de Psiquiatría Ramón de la Fuente Muñiz approved the study (Approval No. CEI/M/104/2021).

All the procedures adhered to the ethical standards of the committee responsible for human experimentation and the Helsinki Declaration of 2000.

RESULTS

Knowledge of the effects of psychoactive drug use

The experimental group displayed a statistically significant increase in knowledge of the effects of tobacco, marijuana, alcohol, and ecstasy use after the intervention. In the control group, no differences were observed between pre- and post-test scores for knowledge of the effects of using any substance.

Life skills

Table 2 shows the average scores for each skill within-group before and after the intervention. After the intervention, the experimental group displayed significant differences in scores for planning for the future, resistance to peer pressure, and taking responsibility. Conversely, the control group showed no significant differences in skill scores between the pretest and posttest.

Risk perception regarding drug use

As can be seen in Table 3, there were important within-group differences in perceived risk of using any psychoactive drug before and after the intervention.

Scope and limitations

It is necessary to replicate the study with larger samples and in various socio-cultural contexts, and to adapt it for implementation in basic education with child participants.

The component designed to influence risk perception requires review and modification, given the discrete variation

Table 1
Knowledge of the effects of drug use, average within-group scores

	Experimental group		*Control group*	
	Pretest	*Post-test*	*Pretest*	*Post-test*
Tobacco	3.35 (± .36)	3.55 (± .41)	3.18 (± .48)	3.20 (± .38)
	Wilcoxon = -1.983, *p* = .047		*p* = .707	
Marijuana	3.12 (± .43)	3.42 (± .32)	3.07 (± .35)	3.19 (± .39)
	Wilcoxon = -2.534, *p* = .011		*p* = .230	
Inhalants	2.76 (± .43)	2.89 (± .51)	2.70 (± .36)	2.80 (± .41)
	p = .523		*p* = .413	
Alcohol	2.74 (± .32)	3.17 (± .38)	2.63 (± .29)	2.65 (± .30)
	Wilcoxon = -3.931, *p* = .000		*p* = .844	
Cocaine	3.34 (± .40)	3.42 (± .35)	3.30 (± .39)	3.29 (± .42)
	p = .617		*p* = .575	
Ecstasy	2.99 (± .44)	3.29 (± .38)	3.06 (± .40)	2.98 (± .58)
	Wilcoxon = -2.625, *p* = .009		*p* = .415	

Table 2
Life skills, average within-group scores

	Experimental group		*Control group*	
	Pretest	*Post test*	*Pretest*	*Post test*
Planning for the future	3.30 (± .73)	3.71 (± .49)	3.34 (± .57)	3.27 (± .76)
	Wilcoxon = -2.047, *p* = .041		*p* = .821	
Assertiveness	2.89 (± .77)	3.29 (± .66)	3.01 (± .69)	2.81 (± .84)
	p = .068		*p* = .425	
Expression of Emotions	3.03 (± .76)	3.02 (± .83)	2.67 (± .67)	2.74 (± .82)
	p = .993		*p* = .587	
Resistance to Peer Pressure	3.41 (± .59)	3.77 (± .31)	3.45 (± .63)	3.41 (± .76)
	Wilcoxon = -2.989, *p* =.003		*p* = .724	
Decision-making	3.18 (± .64)	3.46 (± .72)	3.11 (± .68)	2.85 (± .81)
	p = .186		*p* = .097	
Taking Responsibility	3.22 (± .52)	3.48 (± .53)	2.86 (± .63)	2.92 (± .78)
	Wilcoxon = -1.965, *p* = .049		*p* = .390	

Table 3
Within-group risk perception of substance use

	Experimental group						*Control group*					
	Pretest (n = 38) %			*Post-test (n = 33) %*			*Pretest (n = 35) %*			*Post-test (n = 36) %*		
	ND	*D*	*VD*	*ND*	*D*	*VD*	*ND*	*D*	*VD*	*ND*	*D*	*VD*
Marijuana	5.3	39.5	55.3	9.1	15.2	75.8	14.3	54.3	31.4	8.3	55.6	36.1
	p = .149						*p* = .448					
Ecstasy	2.6	18.4	78.9	6.1	15.2	78.8	0	31.4	68.6	8.3	27.8	63.9
	p = .803						*p* = .275					
Cocaine	2.6	21.1	76.3	6.1	15.2	78.8	0	31.4	68.6	2.8	33.3	63.9
	p = .773						*p* = .655					
Inhalants	2.6	34.2	63.2	6.1	18.2	75.8	5.7	48.6	45.7	11.1	41.7	47.2
	p = .593						*p* = .826					
Frequent alcohol use	7.9	47.4	44.7	6.1	30.3	63.6	8.6	62.9	28.6	5.6	66.7	27.8
	p = .147						*p* = .782					
Smoking five or more cigarettes daily	2.6	34.2	63.2	6.1	15.2	78.8	2.9	31.4	65.7	8.3	38.9	52.8
	p = .317						*p* = .207					
Smoking one or more cigarette pack daily	10.5	21.1	68.4	6.1	15.2	78.8	5.7	20.0	74.3	0	30.6	69.4
	p = .509						*p* = .973					
Smoking one cigarette occasionally	18.4	50.0	31.6	9.1	45.5	45.5	25.7	71.4	2.9	22.2	58.3	19.4
	p = .174						*p* = .128					

Note: *ND* = it is not dangerous; *D* = it is dangerous; *VD* = it is very dangerous.

in scores, suggesting the need to refine it to increase its potential impact.

The increasing use of virtual interventions holds promise for disseminating preventive programs focused on psychoactive drug use among young people, given their familiarity with online platforms and applications (Haugh et al., 2023; Kwame et al., 2025). It is also essential, however, to integrate the evaluation of the effectiveness of the intervention and the process of its implementation to facilitate its scaling.

DISCUSSION AND CONCLUSION

The online application "What Happens if you Go Too Far?", whose effectiveness in increasing knowledge of the effects of psychoactive drug use, increasing risk perception of drug use and enhancing LS in Mexican middle school students was evaluated in this study, has already proven effective among middle school students (Fuentes et al., 2025). The declining age of first drug use and increased availability (INPRFM et al., 2012, 2017) underscore the need for more

effective, accessible, and affordable prevention and intervention strategies for children and adolescents.

As expected, knowledge of the effects of using psychoactive drugs such as tobacco, marijuana, alcohol, and ecstasy increased significantly in the experimental group in the posttest measurement. The post intervention measurement also showed greater knowledge of these drugs in the comparison between the experimental and control groups. These results underline the contribution of this type of universal intervention program to modifying knowledge of the consequences of drug use. They also highlight the impact they can have on the possible reduction of consumption (Ibrahim et al., 2024) and the probable delay in the age of onset, provided they are implemented at more elementary schools and at earlier ages.

Work with the LS model has proven effective in preventing risky behaviors (Skeen et al., 2019) and drug use (Botvin & Griffin, 2014; Tremblay et al., 2020) in adolescents. Specific skills, such as making positive choices and resisting peer pressure, remain important in prevention programs that continue to be evaluated (Sanchez et al., 2019). The results of this study are encouraging in this regard, as some of the LS explored through the intervention (such as planning for the future, resistance to peer pressure, and taking responsibility) showed a significant increase in the post-test measurement in the experimental group and the post-test comparison between the experimental and control groups, in addition to the fact that students increased their assertiveness and decision-making.

Evidence has shown that risk perception plays a crucial role in reducing the likelihood of using psychoactive drugs (Florimbio et al., 2024; González-Roz et al., 2022) and that it is associated with the willingness to learn about their effects (Bujalski et al., 2021). Our study found that risk perception regarding drug use increased in the experimental group after the intervention, specifically in regard to marijuana, inhalants, alcohol, and tobacco. Because risk perception influences health behavior and risk-taking, interventions should aim to increase risk awareness. These interventions could serve as effective tools for addressing drug use in this population by assessing the positive and negative attributes of this issue (Li et al., 2017). The gradual decline in tobacco use can be explained by increased risk awareness due to media campaigns, warnings on packaging, and restrictions on where tobacco can be consumed. If we add the persistent stigma surrounding marijuana and inhalants, the sum of structured and evidence-based intervention strategies increasing risk perception could feasibly bring us closer to reducing the incidence of the initiation and continuation of drug use among adolescents (Florimbio et al., 2024).

The intervention "What happens if you go too far?" has proven effective in increasing knowledge of the effects of psychotropic drugs, enhancing LS, equipping adolescents with the tools to cope with daily challenges and risky situations, and increasing the risk perception of use, which could contribute to their healthy psychosocial development.

This intervention has the advantage of using formats that are easily updatable, dynamic, attractive, interactive (Haugh et al., 2023), accessible to different populations thanks to their digital format, and effective for implementing interventions on a larger scale in school settings (Paz Castro et al., 2022; Schwinn et al., 2018). This is made possible by conventional personal computers and mobile devices (Haug et al., 2021), reducing implementation costs and increasing the likelihood of use for the prevention of psychoactive drug use.

A recent review of the available evidence on virtual interventions to prevent psychoactive drug use among young people in the United States, Europe, Oceania, and Latin America showed that this type of intervention is indeed effective (Kwame et al., 2025).

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Conflicts of interest

The authors declare they have no conflict of interest.

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Anxiety, Depression and Suicidal Behavior in University Students in the State of Mexico

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ABSTRACT

Introduction. Suicide, anxiety and depression are a major public health problem worldwide. In Mexico, the self-inflicted death rate for those aged between 18 and 29 is 10.7 per 100,000 population. Anxiety and depression are common nationwide and strong predictors of suicidal behavior. Research on mental health issues among young university students, however, has tended to focus on medical students. **Objective:** To determine the prevalence of suicidal behavior, anxiety and depression by degree course at a public university in the State of Mexico, and to explore the association between these symptoms and students' sex and semester. **Method:** Quantitative study, with an intentional sample of 269 students of psychology, law, administration, and computer science (68.1%). Students completed a battery of psychological tests. **Results:** An analysis of the data using SPSS v25 found that 53.0 % of students presented anxiety, 28.0 % depression and 30.1% suicidal behavior. Prevalence of the evaluated symptoms was higher in students who had completed more semesters, the presence of suicidal behavior differed by degree course, and women were more severely affected. **Discussion and Conclusion:** A permanent program with a gender approach is required to promote mental health and prevent suicide and psychological distress in university settings. Detected cases should receive specialized care.

Keywords: Depression, anxiety, suicide, youth, vocational training.

RESUMEN

Introducción. El suicidio, la ansiedad y la depresión son un grave problema de salud pública. En México la tasa por muertes autoinfligidas en personas de 18 a 29 años es de 10.7 por cada 100 000. Los problemas de ansiedad y depresión, además de ser predictores de la conducta suicida, tienen altas prevalencias a nivel nacional. La investigación sobre los problemas de salud mental en personas jóvenes universitarias se ha centrado en estudiantes del área de la salud. **Objetivo:** Determinar la prevalencia de conducta suicida, ansiedad y depresión de acuerdo con la licenciatura que cursa el alumnado de una universidad pública del Estado de México, así como establecer la asociación de estos síntomas con el sexo y el semestre. **Método:** Estudio cuantitativo, la muestra fue intencional, participaron 269 estudiantes de psicología, derecho, administración y computación (68.1%), quienes contestaron una batería de tamizajes psicológicos. **Resultados:** Los datos se procesaron en SPSS v25, los hallazgos fueron: el 53.0 % del alumnado presentó ansiedad: depresión 28.0 % y conducta suicida el 30.1%; se identificó que la sintomatología evaluada tuvo mayor prevalencia en estudiantes con más semestres cursados; la presencia de la conducta suicida es diferente en cada licenciatura; las mujeres fueron las más afectadas. **Discusión y conclusión:** Se requiere de un programa permanente para promover la salud mental y la prevención del suicidio, así como el malestar psicológico en el contexto escolar, integrando el enfoque de género. Los casos detectados deben recibir ayuda especializada.

Palabras clave: Depresión, ansiedad, suicidio, juventudes, formación profesional.

INTRODUCTION

Between January and May 2024, 158,814 people in Mexico received care for mental health problems (107,034 women and 51,780 men), particularly anxiety (51.5%) and depression (25.9%). Data by sex show that 73.2% of women presented anxiety and 78.0% depression, whereas in men, the prevalence was 26.8% and 22.0% respectively (Secretaría de Salud [SSA], 2024). Suicide or suicidal behavior is another major public health problem, explored in this paper. Suicidal behavior is expressed as suicide ideation (SI), suicide planning (SP), and suicide action (SA), involving completed suicide or suicide attempts (Bequis-Lacera et al., 2023). The death rate from this cause in young people aged 18 to 29 was 10.7 deaths per 100,000 population (Instituto Nacional de Estadística y Geografía [INEGI], 2021). In 2022, suicide was the fourth most common cause of death in women aged 15 to 24 and the third most common in men (INEGI, 2023). Mental health issues particularly affect young people pursuing degrees, since, as Granados et al. (2020) note, university settings produce an array of stressors.

Mental health problems affect population groups differently depending on their age, sex, occupation, medical history, support networks, degree of exposure to violence, and socioeconomic status (López-Ramírez et al., 2024; Angulo, 2020). The international and national scientific literature has reported that during their time at university, students are exposed to several stressors affecting their mental health. The most serious problems include anxiety, depression and suicidal behavior (Jones & Essounga, 2024; Eisenberg et al., 2023; Liu et al., 2019; López-Ramírez et al., 2024; Torres-Torija & Eguiluz-Romo, 2019; Granados et al., 2020).

Research on anxiety, depression, suicidal behavior, and other mental conditions in higher education students in the State of Mexico (Edomex) is limited. One of the few studies, by Arzate (2020), evaluated symptoms of anxiety, depression and academic stress in a sample of 122 medical students. The results indicated that all participants suffered from stress, there was a significant prevalence of anxiety (21.3%) and women were more prone to depression (63%). The findings showed that Higher Education Institutions (HEIs) foster stressful academic environments, impacting the well-being and mental health of students. In regard to suicidal behavior, Rosales & Córdova (2011) studied a sample of 317 students from a technological university, finding that age and the perception of poor financial circumstances, particularly in women, affect the presence of suicide ideation.

Given the dearth of research on mental health problems in higher education students in Edomex, we examined the work of Hidalgo-Rasmussen et al. (2019), who conducted a cross-sectional study of a sample of 1,229 Mexican students, finding higher levels of hopelessness (14.2%) than SI, SP, or SA. According to the results, hopelessness was due to lack of support from teachers coupled with a non-respectful school environment. Granados et al. (2020) found that of 328 students surveyed, 164 studying medicine and 164 enrolled in other degree courses at a public university, 31% presented anxiety, 17% depression, and 31% suicidal behavior. A comparison of the results of medical students with those of students enrolled in other degree courses found that pursuing a degree in medicine was associated with higher levels of anxiety (58.5%), depression (26.8%) and suicidal behavior (39.6%), all of which are exacerbated in the final years of medical training. The research concluded that academic demands and workloads increase psychological distress in all students, particularly medical students. In regard to suicidal behavior, final year students enrolled in all degree courses are more likely to present this behavior, particularly women.

In their comparative study of 196 Mexican students of nursing, medicine, psychology, and dentistry, and 196 Spanish students of physiotherapy and occupational therapy, Sanabria-Landeros et al. (2021) found that students experienced various symptoms during COVID-19. A total of 66.1% presented moderate to extreme anxiety, with 54% experiencing stress; 49.7% depression 16.8% hopelessness, and 69.4% medium to high SB. This study, like the one by Hidalgo-Rasmussen et al. (2019), found that anxiety, depression and hopelessness are predictors of suicidal behavior, and that Mexican students experienced more psycho-emotional distress. The report by Cervantes et al. (2025) confirmed the presence of SI in 537 students of medicine, dentistry, physical education, public accounting, and business management at a Mexican university. It found that female students had a higher prevalence of SI (10.6%) than male students (9.32) and that economics and administration students obtained higher SI scores than those pursuing medical degrees.

Although the literature described has studied emotional distress in university students, it has focused on medical students. It is therefore necessary to determine whether students enrolled in other degree courses also present symptoms of anxiety, depression or suicidal behavior (Morfín et al., 2021). Our study was also motivated by the findings of Jiménez-Cortés (2017), Guadarrama et al. (2014), Moreno-Salazar & Anaya-Meza (2015), who reported that students in their research experienced psycho-emotional distress and suicidal ideation even before completing their professional studies. This study therefore seeks to determine the prevalence of anxiety, depression and suicidal behavior by degree course at one of the academic units of the Universidad Mexiquense del Bicentenario and the association between these symptoms and students' sex and the semester in which they are enrolled.

METHOD

Study design

We collected the data at an academic unit of the Universidad Mexiquense del Bicentenario (UMB) from June to August 2023.

Participants

At the time of the data collection, total student enrollment was 395. A sample of 269 students (68.1 %) was obtained through non-probabilistic, intentional sampling (Argibay, 2009). The inclusion criteria were as follows: participants must be 18 to 29 years old and be enrolled in one of the four degree courses: psychology (PS, 76. 0% participation); law (LA, 59.1% participation); administration (AD, 67.0% participation); and computer science (COM, 64.2 % participation). The UMB bachelor's degree curriculum comprises nine semesters lasting twenty-five weeks each.

The UMB, located in Edomex, was founded in 2009 to address the gap in higher education supply, guaranteeing access to vocational training for low-income young people (Mejía & González, 2019).

Instruments

A Google Form was developed for data collection and storage in Google Drive. If students agreed to participate in the research, they filled in a sociodemographic questionnaire with data on sex, marital status, degree course, semester, current alcohol and cigarette consumption, and whether they had received mental health care from a psychiatrist or psychologist. The instrument was divided into thirteen multiple-choice questions and five open-ended questions asking them to provide their name, age, place of residence, telephone number, and email.

Three psychological instruments validated in the Mexican population were administered online to identify symptoms of anxiety, depression, and suicidal behavior, (Jurado et al., 1998; Guillén & González-Celis, 2019; Sanabria-Landeros et al., 2021; Granados-Cosme, 2020). These included the following:

Anxiety. Beck Anxiety Inventory, BAI (Cronbach's α = .942). This questionnaire contains 21 questions with Likert-type responses from 0 to 3 (0 = none; 1 = mild; 2 = moderate to 3 = severe). Possible scores range from 0 to 63, with lower scores denoting an absence of symptoms and higher scores indicating severe symptoms. For the data analysis, scores were categorized as "absent to mild anxiety" for totals between 0 and 15 points, and "moderate to severe anxiety" for totals of 16 points or more (Guillén & González-Celis, 2019).

Depression. Beck Depression Inventory, BDI (Cronbach's α = .914). This instrument comprises 21 groups of statements. Each item has four statements with values ranging from 0 to 3 (0 = absence of the symptom evaluated, 1 = the symptom is present some of the time, 2 = the symptom is present all the time, 3 = severe symptom). The sum of the 21 items was the total score, which was divided into two categories. A score of 0 to 16 was classified as "absent to mild depression" and one of 17 or more was classified as "moderate to severe depression" (Jurado et al., 1998).

Suicidal behavior. Plutchik Suicide Risk Scale (Cronbach's α = .829). This instrument consists of 15 questions with a dichotomous response (1 = yes, 0 = no), with a result of over six points indicating the presence of suicidal behavior. For the statistical analysis, totals of 0 to 5 points were categorized as "absent to mild," while six or more points were classified as "moderate to severe" (Sanabria-Landeros et al., 2021).

Procedure

Questionnaires were administered in the university computer laboratory. Students were initially divided into classrooms by degree course and semester completed. They were subsequently invited to participate in the study to answer the evaluation instruments on previously assigned computers.

Statistical analysis

We used SPSS v25 to process the data. Frequency and percentages were calculated for the categorical variables and mean and standard deviation were calculated as descriptive measures for the continuous variables. Groups were compared by examining the association with the chi-square test and means were compared using one-way ANOVA.

The instruments were evaluated as suggested in the literature (Jurado et al., 1998; Guillén & González-Celis, 2019; Sanabria-Landeros et al., 2021). To ensure sufficient sample size, results from the three instruments were combined into two categories: absent to slight and moderate to severe.

Ethical considerations

Students gave their informed consent prior to the commencement of data collection. They were informed of the objective of the study as well as the minimal risks and benefits. Risks included the fact that they might experience slight psycho-emotional distress when answering the questionnaires. With respect to benefits, students whose data indicated areas of concern would receive individual guidance on their health care. They would also be informed of specialized public centers for mental health care (Council of International

Organizations of Medical Sciences [CIOMS], 2016). The research procedures involving human beings were reviewed and approved by the UMB Academic Directorate with authorization number UMB/210C3001020000L/159/2023.

RESULTS

A total of 68.4% of the 269 students were female, and aged 18 to 27. Approximately 96% lived in Edomex and 92.4% were single. Twenty-five per cent of students worked, with a higher proportion of women (14%). In other words, they combined studying and working, compared to 11% of men. Fourteen per cent of students reported that they smoked and 19.7% drank alcohol, including more women (14.5%) than men (5.2%). With respect to their health care, 32.7% of participants said they had seen a mental health professional (a psychiatrist or a psychologist) in the past 12 months, with a higher proportion of women using these services (Table 1).

Table 1
Sociodemographic data of participants (n = 269)

	Women		*Men*		
	n	*%*	*n*	*%*	*Total*
Sex	184	68.4	85	31.6	269
Single	171	63.6	78	29.0	249
Married	10	3.7	3	1.1	13
Has a job	38	14.0	30	11.0	68
Health Habits					
Smokes	27	10.0	11	4.2	38
Drinks alcohol	39	14.5	14	5.2	53
Has consulted a mental health professional	63	23.4	25	9.2	88
Age Range	Median age			*SD* age	
18-27	20.16			2.024	
Origin	State of Mexico			Mexico City	
	258 (96%)			11 (4%)	

Note: Frequency and percentages analysis. Calculation of mean and standard deviation as descriptive measures.

The participation of students by degree course and gender is given in Table 2. The largest number of participants was pursuing a bachelor's degree in psychology (46.5%). Women comprised 68.4% of participants, with men accounting for 31.6%.

The prevalence of anxiety, depression, and suicide risk symptoms is given in Table 3, as well as the cut-off point for each scale. Fifty-three per cent of participants presented anxiety with moderate to severe symptoms. In the case of depression, 28 % of students showed moderate to severe depression. Finally, 30.1% of participants displayed suicidal behavior (Table 3).

The chi-square test did not yield a significant association between symptoms and sex, although a greater presence of anxiety, depression and suicidal behavior was identified in women. For every ten women who completed their degrees, six presented symptoms of moderate to severe anxiety, as opposed to only four out of every ten men. In the case of moderate to severe depression, three out of ten women displayed these symptoms, while two out of ten men had depression. With respect to suicidal behavior, three out of ten women displayed this behavior as opposed to only two out of ten men.

Other results indicated that PS students presented higher anxiety symptoms, followed by those enrolled in the LA and COM degree courses, showing that students in the area

Table 3
Prevalence of symptoms by sex

Symptoms	*Women*		*Men*		*Statistical comparison*
	n	*%*	*n*	*%*	
Anxiety	(*n* = 176)		Man (*n* = 87)		
Absent to Slight	72	40.9	50	57.5	$X^2 = 7.04$
Moderate to Severe	104	59.1	37	42.5	$p = .030$
Depression	(*n* = 177)		(*n* = 80)		
Absent to Slight	121	68.4	64	80.0	$X^2 = 3.70$
Moderate to Severe	56	31.6	16	20.0	$p = .157$
Suicidal behavior	(*n* = 183)		(*n* = 86)		
Absent to Slight	122	66.7	66	76.7	$X^2 = 2.83$
Moderate to Severe	61	33.3	20	23.3	$p = .243$

Note: X^2, $v = 1$.

Table 2
Student participation by degree course and sex (n = 269)

Bachelor's degree area		*Students who participated*						*Students who did not participate*	
				Women		*Men*			
	Enrolment	*n*	*%*	*n*	*%*	*n*	*%*	*n*	*%*
Psychology	165	125	76.0	98	53.3	27	31.8	40	24
Law	120	71	59.1	46	25.0	25	29.4	49	41
Administration	82	55	67.0	37	20.1	18	21.2	27	33
Computer Science	28	18	64.2	3	1.6	15	17.6	10	36
Total	395	269	68.1	184	100.0	85	100.0	126	32

Note: Frequency and percentage analysis.

Table 4
Difference between anxiety, depression and suicide risk by degree course

Scale	*Degree*	*n*	*Media*	*Median*	*SD*	*Significance*
Anxiety (*n* = 263)	Psychology	112	23.50	22.00	14.16	< .001
	Law	73	17.51	14.00	13.81	
	Administration	61	15.54	12.00	12.46	
	Computer Science	17	16.71	11.00	12.91	
Depression (*n* = 257)	Psychology	113	16.65	12.00	13.35	< .001
	Law	76	10.29	8.00	9.39	
	Administration	57	9.09	7.00	8.72	
	Computer Science	11	17.09	15.00	15.21	
Suicidal behavior (*n* = 269)	Psychology	123	5.04	4.00	3.61	< .001
	Law	76	3.53	3.00	3.16	
	Administration	55	2.87	3.00	2.52	
	Computer Science	15	3.73	3.00	3.86	

Note: Simple ANOVA test.

Table 5
Anxiety, depression, and suicide risk symptom frequencies by semester (n = 269)

	Semester										
	First		*Third*		*Fifth*		*Seventh*		*Ninth*		
Symptoms	*n*	*%*	*n*	*%*	*n*	*%*	*n*	*%*	*n*	*%*	*Statistical comparison*
Anxiety	*(n = 48)*		*(n = 108)*		*(n = 43)*		*(n = 37)*		*(n = 27)*		
Absent to Slight	29	60.4	44	40.7	20	46.5	16	43.2	13	48.1	X^2 = 9.0
Moderate to Severe	19	39.6	64	59.3	23	53.5	21	56.8	14	51.9	*p* = .341
Depression	(*n* = 48)		(*n* = 104)		(*n* = 53)		(*n* = 32)		(*n* = 20)		
Absent to Slight	40	83.3	79	76.0	37	69.9	18	56.2	11	55.0	X^2 = 15,7
Moderate to Severe	8	16.7	25	24.0	16	30.1	14	43.8	9	45.0	*p* = .046
Suicidal behavior	(*n* = 46)		(*n* = 109)		(*n* = 51)		(*n* = 36)		(*n* = 27)		
Absent to Slight	35	76.1	79	72.5	37	72.5	21	58.3	16	59.2	X^2 = 11.5
Moderate to Severe	11	23.9	30	27.5	14	27.5	15	41.7	11	40.8	*p* = .174

Note: X^2, *v* = 4.

of administration were the least likely to suffer these symptoms (Table 4).

COM students experienced the most depression symptoms, followed by PS and then LA students. Once again, those with the fewest depression symptoms were enrolled in the AD degree course.

The chi-square test failed to identify a significant association between the semester in which students were enrolled and the symptoms evaluated across all areas of knowledge. However, the proportion of students with moderate to severe symptoms increased after the first semester. The same was also true of anxiety, depression, and suicidal behavior. In the case of anxiety, prevalence increased from 40% in the first semester to approximately 60% in subsequent semesters. The proportion of depression and suicidal behavior increased with every semester (Table 5).

Finally, the results showed that a significant number of students experienced anxiety, depression and suicidal behavior, with more women presenting these symptoms.

DISCUSSION AND CONCLUSION

This research identified three main outcomes, the first being the prevalence of moderate to severe symptoms of anxiety, depression, and suicidal behavior among participants. The second was that prevalence differed across degree courses. The third was that woman were more affected by the symptoms assessed. The significance of these findings is explained below.

In regard to the prevalence of moderate to severe symptoms, 53.0% of students were found to present anxiety, 28.0 % depression, and 30.1% suicidal behavior, the first two being a predictor of suicide (Arzate, 2020; Angulo, 2020). The results obtained were consistent with various studies indicating that students' mental health suffers while they are at university (Cervantes et al., 2025; Jones & Essounga, 2024; Eisenberg et al., 2023; López-Ramírez et al., 2024; Sanabria-Landeros et al., 2021; Arzate, 2020; Granados et al., 2020; Liu et al., 2019; Hidalgo-Rasmussen et al.,

2019; Rosales & Córdova, 2011). These results underscore the need for the timely detection of suicidal behavior and psychological distress within educational settings (Jones & Essounga, 2024; Herrera, 2022).

In response to these problems, some universities in Mexico (Torres-Torija & Eguiluz-Romo, 2019) have allocated resources and planned psychological counseling services, including referrals to specialized services, to support students with emotional distress. The effectiveness of life skills programs and the promotion of healthy lifestyles in university settings has also been demonstrated (Romero et al., 2013; Bonilla-Flores et al., 2021). With respect to suicide prevention within the university context, Santillán & Suárez, 2023 and Torres-Torija et al. (2019) have documented suicide response protocols and training as community guardians. The contributions of the literature cited in this paper should be considered by the university where the research was conducted to address the mental health problems present in its students. Protective strategies to prevent suicidal behavior should also be promoted (López-Ramírez et al., 2024).

This study also found that students' sex, semester, and degree course influence their symptoms. PS, COM, and LA students scored higher on moderate to severe symptoms of anxiety, depression, and suicidal behavior, with women being more affected. This result was consistent with research by Cervantes et al. (2025), Sanabria-Landeros et al. (2021), Granados et al. (2020), Rosales & Córdova, 2011). Recognizing how gender and degree courses influence mental health helps identify students at higher risk, allowing for targeted preventive measures.

This information allows the university to assess factors within the university environment that may be associated with psychological distress among students, supporting efforts to promote mental health. According to the literature (Herrera, 2022; Hidalgo-Rasmussen et al., 2019; Arzate, 2020), universities should consider aspects such as academic demands and/or overload, lack of institutional support during university studies, the perception of a hostile academic environment, discrimination, and stigma toward people with psycho-emotional distress. Another aspect worth exploring is the university's commitment to caring for the mental health of its community, as some authors report a lack of interest or knowledge of these issues in the educational sphere (Gomes & Sá, 2025; Santillán & Suárez, 2023).

Finally, it is also necessary to recognize the health status of women, an issue that warrants further research. The scientific literature reviewed (Rosales & Córdova, 2011) showed that women display symptoms of anxiety and suicide ideation even before starting their degrees, due to the academic workload involved, as well as their financial circumstances. The combination of these social conditions compromises their health status. According to the results of this study, 14% of women experience greater pressure when they combine work and university studies.

What observations can be made regarding the advancement of understanding suicidal behavior among men? Although this research revealed a higher prevalence of symptoms in women, men may experience the psycho-emotional distress they feel for longer or receive less information on mental health, as noted by López-Rivera (2021) and Torres-Torija & Eguiluz-Romo (2019). In this respect, one of the main limitations of the study was the lower participation rate among men and the absence of analysis of students' sexual diversity, since the latter group is also affected by mental health problems (Rentería et al., 2021).

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Conflict of interest

The authors declare that they have no conflict of interest.

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Life Skills and Suicidal Behavior among Adolescent Students in Mexico

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ABSTRACT

Introduction. In 2018 and 2021, suicide was the third leading cause of death among Mexican adolescents. Understanding how this population group copes with the challenges of everyday life constitutes a crucial step in the development of the life skills (LS) approach in schools, contributing to suicide prevention efforts. **Objective.** To characterize specific LS experiences with respect to suicidal behavior among adolescent students in three states of Mexico prior to implementing an educational initiative for suicide prevention. **Method.** We conducted qualitative research, using information gathered from six focus groups (FGs) of middle school students and content analysis. **Results.** Three LS were explored: decision-making, problem-solving and conflict resolution (negotiation) and managing emotions. The experiences students shared were mainly linked to family and school environments, where asymmetrical power relations between adolescents and adults undermined the development of these skills. Participants' knowledge of suicidal behavior stemmed from close experience of either attempted suicide or self-harm practices. **Discussion and conclusion.** The findings of this study highlight the importance of implementing LS interventions in schools given the limited development of these skills among adolescents. Determining the status of LS in the student population prior to conducting educational interventions is key to designing effective actions and adapting the LS approach to the specific socioeconomic and cultural contexts of students and their families.

Keywords: Suicidal behavior, life skills, students, adolescents, suicide.

RESUMEN

Introducción. En 2018 y 2021 el suicidio fue la tercera causa de muerte en población adolescente en México. Conocer cómo los adolescentes afrontan situaciones de la vida cotidiana para implementar el enfoque de habilidades para la vida en las escuelas tendrá beneficios en la prevención del suicidio. **Objetivo.** Caracterizar las vivencias de algunas habilidades para la vida y el acercamiento que tienen con la conducta suicida adolescentes escolarizados en tres entidades federativas de México, previo a la implementación de una iniciativa educativa para la prevención del suicidio. **Método.** Investigación realizada con metodología cualitativa. Para recolectar información se efectuaron seis grupos focales con estudiantes de secundarias públicas. Se llevó a cabo un estudio fenomenológico con análisis de contenido. **Resultados.** Se exploraron tres habilidades para la vida: toma de decisiones, negociación y manejo de emociones. Destacan vivencias en el entorno familiar y escolar donde las relaciones asimétricas de poder entre adolescentes y adultos irrumpe en el desarrollo de dichas habilidades. Sus conocimientos sobre la conducta suicida surgen de experiencias cercanas con intentos de suicidio o prácticas autolesivas. **Discusión y conclusión.** Los resultados obtenidos muestran la pertinencia de implementar intervenciones en HpV, ya que se identificó son practicadas de manera limitada. Indagar la situación en las que se encuentran las HpV con estudiantes previo a efectuar una intervención educativa es un insumo fundamental para el diseño de la intervención y para considerar condiciones específicas del contexto socio-económico y cultural en el que se encuentran los estudiantes, sus familias y las escuelas.

Palabras clave: Conducta suicida, habilidades para la vida, estudiantes, adolescentes, suicidio.

INTRODUCTION

The period between 10 and 19 years, referred to as adolescence, constitutes the transition from childhood to adulthood and entails a range of opportunities and challenges. The current generation of adolescents, the largest in history, comprises one sixth of the world population (Organización Mundial de la Salud [OMS], 2025). Students grapple with enormous complexities, ranging from climate change, poverty, and pandemics to unprecedented levels of armed conflict, technological development, and migratory movements (OMS, 2024a).

Adolescence is often marked by situations affecting life and health, with traffic injuries, interpersonal violence, and suicide representing the three principal causes of death during this period (OMS, 2024a).

According to the World Health Organization (WHO), deaths by suicide have diminished globally in recent years, falling from 762,000 in 2000 to 717,000 in 2021. In the Americas, however, their incidence has risen from 7.2 per 100,000 population in 2000 to 9.8 in 2021 (World Health Organization [WHO], 2024). Suicide in this region is the third leading cause of death for people aged 15 to 29 (OMS, 2024b).

According to the National Institute of Statistics, Geography and Informatics of Mexico (Spanish acronym INEGI), deaths from suicide have increased nationwide from 5.3 per 100,000 population (6,494) in 2017, to 6.3 (8,123) in 2022 and 6.8 in 2023 (Instituto Nacional de Estadística y Geografía [INEGI], 2023; 2024). In 2018 and 2021, suicide was the third leading cause of death within the groups aged 10-14 and 15-24 (INEGI, 2021).

Suicidal behavior (SB) represents a continuum encompassing ideation, planning, attempt, and actual suicide (Salvo & Melipillán, 2008), with attempted suicide being the main predictor of suicide (WHO, 2014). According to the 2022 National Health and Nutrition Survey, 7.6% of adolescents in Mexico have contemplated suicide at some point in their lives, with the prevalence of lifetime suicide attempts reaching 6.5%. Females report higher rates of suicidal ideation and attempts than males (Valdez-Santiago et al., 2023).

Given the challenges facing adolescents, the WHO has encouraged schools to adopt the life skills (LS) approach in their facilities, so that teachers can use this strategy with students in this age group (WHO, 2003). The Live Life Guide, published by the WHO in 2021, recommends incorporating LS with students as an evidence-based intervention for suicide prevention. A key feature of this approach is that it provides a positive perspective on mental health rather than focusing on suicide (Organización Panamericana de la Salud, 2021).

Within this framework, LS are defined as "…abilities for adaptive and positive behavior that enable individuals to deal effectively with the demands and challenges of everyday life" (WHO, 2003, 2020). These skills fall into social, cognitive and emotion-control categories, which in turn are subdivided into 10 groups: self-awareness, effective communication, decision-making, creative thinking, managing feelings and emotions, interpersonal relationships, empathy, problem-solving and conflict resolution, critical thinking, and stress management (Mangrulkar et al., 2001). Systematic reviews of this issue suggest that implementing the LS approach in schools enhances the mental health of the adolescent population (Fenwick-Smith et al., 2018; Singla et al., 2020). Although efforts have been made to promote LS in school contexts, there is a dearth of published studies in Mexico. Research on LS has not focused on suicide prevention (SP) (López et al., 2022; Morales Rodríguez et al., 2013), but rather on other topics such as addiction prevention (Fuentes et al., 2023; Mojarro, 2020). Only one LS study on SB was identified, conducted on 26 students at a high school (González-Cruz, et al., 2023).

This article analyzes the specific LS and degree of familiarity with SB middle-school adolescents in three Mexican states had acquired prior to the implementation of a suicide prevention initiative.

METHOD

Study design

This study is part of a larger project entitled Educational Interventions for Preventing Suicidal Behavior among Adolescents in Mexico. The study using mixed methods was conducted between 2022 and 2024. Three interventions for the prevention of SB were implemented and evaluated with middle school adolescents in urban settings. The qualitative component of this research included pre-intervention FGs with teachers and students.

This article analyzes the FGs conducted with students who subsequently participated in the educational interventions designed to enhance their life skills.

The methodology of these FGs, described below, is based on the three dimensions of the Consolidated Criteria for Reporting Qualitative Research (COREQ) (Tong et al., 2007).

Research and reflexivity team

The authors formed part of a larger multidisciplinary research team. Four women and one man with experience in qualitative methodology and conducting FGs participated in the analytical phase: two psychologists (one with experience in clinical psychological clinical), a doctor, a nurse, and an anthropologist. Three held doctorates and two master's degrees in health systems, medical anthropology, and public health and they were all aged between 30 and 65.

Given the topic of our research, we adopted a phenomenological perspective, with content analysis (Gibbs, 2012).

Participants

Participants were selected by convenience, or non-randomly, using the inclusion criteria of the broader project mentioned above. Selection was performed sequentially: first the participating states, then the schools, and finally the students. Five states were selected for the broader project: Baja California Sur, Campeche, State of Mexico, Querétaro, and Morelos. They were selected by convenience, seeking collaboration with health authorities committed to participating in all the project activities for three years. The only inclusion criterion was signing a collaboration agreement.

Three public middle schools fulfilling the following inclusion criteria were subsequently selected in each of these states: 1) being located in urban areas, 2) having the required infrastructure for the project activities.

Finally, participants, including adolescents, were selected. The study was presented to the school authorities, who, in turn, explained the objective of the study and its activities, including the FGs, to the parents. Parental consent and informed consent from the adolescents were obtained from those who agreed to participate. For the FGs, those who had participated in the activities prior to the FGs and were in the groups that would participate in the educational interventions were selected.

The FGs were held at the school facilities and scheduled in June 2023 as suggested by the academic authorities to facilitate student attendance. Since it was decided that one FG would be conducted per school, the theoretical saturation criterion was not followed. Six FGs were held in three states: one in Baja California Sur, two in Campeche, and three in Morelos. Two research team members traveled to each state for this purpose. A total of 53 students from public middle schools participated, 28 in second grade and 25 in third grade. Twenty-four of the students were female and 29 male, with an age range of 12 to 15 years, and an average age of 14.

Procedure

Prior to conducting the FGs, we screened the selected schools to determine the prevalence of SB. During this initial contact, students were informed about the study. Throughout the research process, the team assumed an ethical position toward students in the FGs and the school authorities. We prioritized delivering reports to the state authorities as the basis for formulating public policies.

A question guide was prepared for data collection, emphasizing LS in relation to SB in adolescent students.To this end, the research team held meetings to delimit the sections by topic of interest and design the questions. Team members selected to conduct the FG workshops participated in this task to ensure that everyone fully understood the guide during data collection. Although pilot tests were not conducted, the first FG fulfilled that purpose. The research team subsequently adapted the guide based on students' understanding and reactions to the questions. The FG guide included three LS-focused sections exploring perceptions and experiences regarding decision-making, negotiation, and emotion management. Another section focused on identifying knowledge of SB and attention seeking, while the final section addressed reflections on the importance of developing LS for adolescents.

Only the selected students and two research team members were present at each FG. One researcher moderated the session while the other took notes. All the FGs, lasting approximately 30 to 90 minutes, were audio-recorded. Audios were transcribed verbatim using a word processor and confidentiality was always maintained. Transcripts were not shown to the students for comments and/or corrections.

Analysis

The research team audio-recorded the FGs, transcribing them verbatim into a word processor. They then read the transcripts and performed qualitative content analysis.

The research team drafted a codebook based on the revised question guide, defining three central phenomena of interest: students' LS, SB, and perceptions of the LS workshops as reference for future initiatives. Five analytical categories emerged from these variables: (1) decision-making, (2) problem-solving and conflict resolution (negotiation), (3) managing emotions, (4) knowledge of SB, and (5) perceptions of the LS workshops. The resulting 30 codes served to conduct an initial deductive analysis of the data obtained.

Atlas Ti version 9 was used in the analysis because of its suitability for information management (Cisneros, 2002). We began by reading each transcript and segmenting the text according to the pre-established codes. We then reread the codes to differentiate their contents and ensure compliance with the concepts in the codebook. We subsequently identified units of meaning in each segment and, by constantly comparing the codes, established our initial findings regarding the relationship between selected LS and students' knowledge of SB.

We read each transcript again using inductive analysis. New fragments of the students' discourse ("open codes") emerged, revealing two new categories of experience related to suicide and distrust.

Although we did not corroborate the findings with the students, we recorded the characteristics of their interaction during the FGs.

Ethical considerations

This study was part of a larger project entitled Educational Interventions for the Prevention of Suicidal Behavior among Students in Mexico, approved by the Research Ethics Committee of the National Institute of Public Health (CI:1742, Folio I07). The FGs described in this article were conducted after we had obtained informed assent from the participating students and informed consent from their parents or guardians.

RESULTS

The main findings are given below, organized by the analytical axes of our work. First, the status of participants is described with respect to the development of each LS explored: decision-making, problem-solving and conflict resolution (negotiation) and managing emotions. Students' knowledge of SB is then addressed, followed by an examination of the categories that emerged from their discourse with respect to experiences concerning suicide and lack

Table 1
Characterization of life skills among adolescents participating in focus groups

Analytical axes	*Sample quote*
Decision-making	
Decision-making contexts	*Interv*: Ok. And at school, do adults also decide for you? *I-F*: Yes, about coming to school. *Interv*: Coming to school. What else? Your teachers, the prefects, the directors? *I-M:* How we should dress. *Interv*: How you have to dress? *I-M*: How we have to cut our hair. *I-F*: Or where we have to sit, sometimes. (*GF-CAM-04*)
	I-F: Unfortunately, not me. They say, "Either you wear these clothes, or you don't go out, you stay home." So, in other words, if I say an outfit, unfortunately my mom tells me yes, well, yes, that she doesn't want me to wear those clothes. Sometimes she gets upset with me and starts saying, "Oh, you're going to wear this again?" or something like that, and then she grabs my clothes, and I put them on. (*GF-CAM-02*)
Dichotomous decisions	*I-F*: Like, for example, hm, what to do: go and train, yes, yes or no, like in any type of problem that I may have, I always choose something that makes me feel good, that doesn't make me feel uncomfortable in a problem or another kind of thing. (*GF-CAM-04*)
	Interv: Well, yes, they're decisions. And what other decisions do they make? *I-M*: Whether to get up. (*GF-BCS-02*)
Problem-Solving and Conflict Resolution (negotiation)	
As a bribe	*Interv*: How would you define what negotiating is? *I-F*: It's like, well, I had a kind of confusion with my sister who said, "If you don't buy this for me, I'm going to tell my [our] parents." *Interv*: And did you buy it for her? *I-F*: Well, yes, I had to buy it for her, but she told my parents anyway. (*GF-MOR-05*)
Offering something in return	*I-F:* Once, I negotiated with a friend. I didn't do my homework, and I had to, for example, give him some bills for doing my homework... (*GF-MOR-03)*
	I-M: Well, it's when I want to go out, yes, go out. Then, hm, I start doing things around the house. I wash the car, and I've already done this type of negotiation... (*GF-BCS-02)*
Managing emotions	
*Emotions according to contex*t	*I-F*: No, at school, mostly, I feel good because here I can be myself. At home, sometimes, if I see something I like, sometimes, if my mom tells me not to do it because that's supposed to be bad, and the truth is, yes, a little more. (*GF-BCS-02)*
	I-F: For example, here at school, I feel, like, I don't know, very happy, or things like that, or sometimes discouraged because I don't want to come. (*GF-MOR-03)* *I-F*: For me, well, when it comes to school, when it comes to school, my emotions get nervous, anxious and calm, and a little happy. (*GF-MOR-03)*
Difficulty naming emotions	*Interv*: What emotions do you think you often feel? *I-M*: Hm, happiness and anger *Interv*: Another other emotion? *I-M*: Sadness *I-M*: Is despair an emotion? (*GF-MOR-0*6)
	I-M: Well, yes, that "I don't care" thing happens when you're angry or sad or think about a situation that's happened to you and you say that you don't care anymore or that it's already in the past. But I feel that's only to let go of how bad you feel that moment or what you experienced, and the best thing is to forget it or do new things to let go, let go of all that past. (*GF-CAM-02)*

Note: *Interv*: Interviewer; *I-M*: Intervention-male; *I-F:* Intervention-female; *FG-CAM*: Focus Group-Campeche; *FG-BCS*: Focus Group-Baja California Sur; *FG-MOR*: Focus Group–Morelos.

of trust in their teachers and caregivers. Finally, we present our findings on participant perceptions and suggestions regarding the workshops. The testimonials from the FGs are shown in tables as an analytical-narrative resource summarizing the fragments of discourse exemplifying the content of the categories and brief testimonials are given in one of the sections.

Decision-making

Students reported that adults made most decisions for them at school and in their families. At school, these decisions largely involved the discipline exercised by teachers. They also concerned matters students felt they should be responsible for deciding themselves. Decisions they were allowed to make mainly concerned dichotomous choices regarding everyday actions yielding immediate perceived benefits (Table 1).

Participating students were beginning to improve their decision-making skills, since adults made most of the latter in their school and family settings. Respondents did not feel that they or others, apart from teachers and primary caregivers, could make decisions in the community.

Problem-solving and conflict resolution (negotiation)

The experiences reported by students suggest that they begin to develop this skill within the family. There, they learn and experience an asymmetric form of negotiation in which permissions and pardons were requested from parents and favors were asked of siblings in return for performing activities or giving them something. At school, they learn to solve problems and resolve conflicts through making requests of their classmates, often offering money in exchange, which shapes their negotiating style.

Notably, students equated the term "negotiation" with giving bribes, or buying or selling items. "I-M: I once negotiated with a friend. I hadn't done my homework and I had to do it and now I have to pay him for example a few bills for doing my homework," FG-MOR-03. Participants from all three states regarded negotiating as an activity in which they were obliged to offer something in exchange for what they needed or wanted. "I-M: Maybe I want something and I'll tell them that if they buy it off me, I'll do something to help, or something like that" FG-MOR-05 (Table 1).

Managing emotions

The family was the context with the greatest density and diversity of emotions. However, there was a link between family and school environments, in that emotions that occurred in one were channeled towards the other and vice versa.

The most frequently reported emotions in the family setting were anger and frustration, related to family dynamics within the family and the nature of the interaction between adults and youths. Other crucial factors included the socioeconomic status of the students, often linked to alcoholism and/or domestic violence.

A conversational pattern observed during the sessions enabled us to identify a behavioral mechanism called "emotional regulation," which included a series of behaviors students engaged in to help manage their emotions. Figure 1 shows the specific emotions reported and related attempts at emotional regulation, illustrating the coping strategies students used to manage them. Figure 1 shows the emotion that triggers the most mechanisms and the type of emotion.The left column shows the emotions identified in the adolescents while the right one shows the main mechanisms for emotional regulation.

Emotional regulation was not described as a single event, but rather as a series of consecutive actions. For example, some participants reported that they or a classmate had experienced an emotion such as sadness and had attempted to achieve emotional regulation by going to a secluded place and then crying or engaging in self-inflicted violence. This may have indicated a lack of skills for containing emotions, which would have prevented self-harm. Participants also identified positive emotions such as happiness but did not elaborate on how they had experienced these feelings.

When we examined emotional regulation, it was clear that this process was undertaken individually. Among the range of mechanisms available to students for managing emotions, talking about their feelings with others was not usually their first choice. Another finding was related to the difficulty participants experienced in naming their emotions, either because they could not identify them or

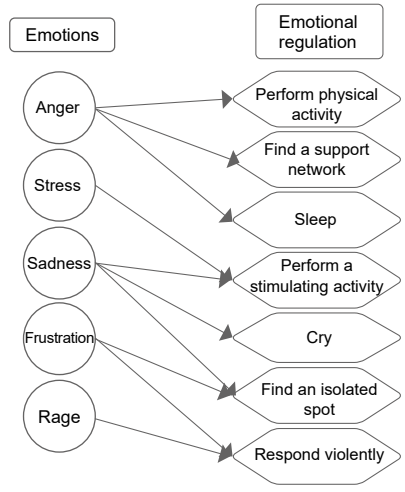

Figure 1. Frequent emotions and emotional regulation among adolescents participating in focus groups.

because they attempted to find words that conveyed indifference (Table 1).

Knowledge and experiences of suicidal behavior

The meanings of SB varied among students from different states. For example, in Baja California Sur and Morelos, SB was conceived of as a thought, something that suddenly appeared and lodged in the mind, whereas in Campeche, it was considered a way out, something that "happened," providing a solution (Table 2).

Students from Campeche did not mention suicidal ideation. They only thought of SB at the time it took place, conceptualizing it as "a way out." This perception was a recurrent pattern in the six FGs. Students constructed their concept of suicide through their experiences in both family and school contexts. At school, this was sometimes due to knowing a classmate who had said they wanted to take their own life or engaged in self-harm practices. At home, some participants had a close relative who had taken their own life, or had even attempted suicide themselves (Table 2).

However, students generally regarded themselves as being skilled at identifying risk situations related to SB among their peers. These included a classmate declaring that no one understood them, saying that they did not feel like doing anything or that they perceived everything negatively. This skill was mentioned by students in six GFs. However, only those in Campeche and Morelos expressed a willingness to talk, question or give advice to their classmates regarding their behavior. They even mentioned their willingness to provide support if their classmate so required.

In Morelos, students also declared that they would be willing to help their friends and classmates seek professional care outside school by identifying specialized mental health-care venues they themselves had attended (Table 3).

In Campeche, students did not mention spaces either inside or outside the school environment, where they could ask for help if a classmate displayed *SB*. However, they did mention certain school figures whom they felt they could approach to talk about SB, such as the school principal and group tutor. They also said that they felt confident talking about SB with certain teachers. This teacher-student bond of trust was also present in Morelos, in specific contexts, even with teachers from areas other than psychology (Table 3). These dynamics of trust between teacher and students were not reported in Baja California Sur.

When asked whether they would feel comfortable approaching the school psychologist, if one were available, students in Morelos replied that this would depend on the degree of trust they had established with them.

Students' distrust emerged as a category in all six FGs. It was reflected in their limited attempts to seek spaces or situations where they could talk to educational figures or their primary caregivers about their emotions, personal

Table 2
Knowledge and experiences of suicidal behavior among adolescents participating in focus groups

Analytical axes	*Sample quote*
SB as a thought	*I-M*: They come up, like thinking about taking your life. (*GF-BCS-02*)
	I-F: …and he's going to start saying that, in his mind he's going to say, "Well, no one loves me, everyone's going to hate me. It would be better for me to die so they really see how I feel…" (*GF-MOR-03*)
SB as a "way out"	*I-M*: It's like looking for a way out. They say something like that to other people to solve what they, what they have. It's a lot like "Oh, it's just that if I continue in this, if I continue here, I'm no good for anything anymore, nobody cares about me." Something like that. (*GF-CAM-04*)
	I-F: Like, I could tell him [or her] to look for help. It's like, because, like, they say they all believe that committing suicide is a way out of the problem, but it's not. (*GF-CAM-04*)
Experiences related to suicide	*Interv*: Have you had a close experience of someone taking their own life or attempting to do so? I-M: I lost an uncle who committed suicide. (*GF-BCS-02*)
	I-F: I tried four times, but no. Interv: You tried it? How did you do it? *I-F*: Huh? *Interv*: How did you do it? *I-F*: Oh, it was several ways, but I never dared because I was afraid of dying. I was afraid of dying, that it would hurt. *Interv*: So you planned it, but you didn't go through with it, you stayed there? *I-F*: Like, I already had the time, the date, everything. I had everything planned, but I didn't end up doing it because I started to think and said, "It's going to hurt, no, I'd better not." (*GF-BCS-02*)
	I-F: …in fact, they found me lying there. They took me to the hospital, they treated me. Since I didn't know about that, I didn't get to cut my veins. I didn't cut myself here, I just cut myself here, too. Since I heal quickly, well, you can't see it any more, you can't tell, but I always called my parents to get me out of the center because I didn't want to be there. (*GF-CAM-02*)

Note: Interv: Interviewer; *I-M*: Intervention-male; *I-F*: Intervention-female; *FG-CAM*: Focus Group-Campeche; *FG-BCS*: Focus Group-Baja California Sur; *FG-MOR*: Focus Group-Morelos; *SB*: Suicidal behavior.

Table 3
Experiences associated with care for suicidal behavior among the adolescents participating in focus groups

Analytical axes	*Sample quote*
Willingness to support a schoolmate	*I-F*: So when you feel bad, call me or whatever, tell me. To accompany the person because the person, more than anything, that person has to come out of it herself [or himself]. Nobody can… (*MOR-06*)
	I-F: Tell him [or her] that that person, well yes, it does help to lift people's spirits, or that that person is important, or tell him [or her] encouraging things like that. (*GF-CAM-04*)
	I-F: …better still, I would approach him and talk to him and ask him what's happening to him, and try, try to help him, encourage him, always be with him and always try to accompany him all the time to see that nothing bad happens to him. (*GF-MOR-03*)
	I-F: Well, when a person feels like killing himself, it's better to stay there all the time with him and never leave him alone because, by [not] being attentive, you would leave him in a deep state of depression, and he'll start to say that, in his mind, he'll say, "Well, no one loves me, everyone's going to hate me. It would be better for me to die so they really see how I feel." It's better for me to stay with that person to help him." (*GF-MOR-03*)
Seeking professional assistance outside the school environment	*I-M*: Me, for example, about my friend, I would try to find a psychologist or my psychologist that I have, to tell him what's happening to my friend, and that I can tell him, I don't know if I can tell him a little to help me help my friend with what's happening to him. (*GF-MOR-3*)
	Interv: And, let's say, do you identify an institution in addition to a person? We already know that you go to the hospital when you feel bad. *I-F*: CAISA *Interv*: What's CAISA? *I-F*: Oh, I don't remember exactly, but I go there. It's like a help center for adolescents. (*GF- MOR-06*)
Teacher-student bond of trust	*Interv*: Here at school, can you identify any teacher that you generally trust? *I-M*: Yes. *I-F*: Yes. *I-F*: Yes. *Interv*: Who is it? *I-M*: A teacher [called] L. *I-F*: A teacher [called] A. *I-F*: Teacher L. and teacher A. *Interv*: What subjects do they teach? *I-F*: Chemistry and Spanish. (*GF-MOR-05*) *Interv*: Do you think students would go to them and ask for help? *I-F*: I think it depends on their problem, you know. *I-F*: It depends on their problems, and the emotions or problems they have. (*GF- MOR-03*)
Distrust	*I-M*: I keep it to myself. *Interv*: You keep it to yourself, where? *I-M*: Sometimes I feel strange, but I don't talk about it. (*GF-BCS-02*)
	I-F: Besides, my emotions are because of problems, so, and when I talk about them, it's very difficult for me because I feel that person can judge me or say something. (*GF-CAM-04*)
	I-F: I say that [In my opinion,] asking for help to tell someone, having someone I can talk to about my luck, because, mostly, I keep all my problems to myself, I don't have anyone I trust to tell something like that to. I don't know if, if I would need someone to count on. (*GF-CAM-04*)
	I-F: I don't know, the psychologist seems cool to me. *I-M*: More than anything because of lack of trust. *I-F*: Because of the trust that can come through… *I-F*: And because of everything you're telling her, you don't know if she tells parents or something like that. She could tell one of your classmates and your parents or someone else, and there you'll feel that all the information that you gave her, she's going to know that everything… (*GF- MOR-03*)

Note: *Interv*: Interviewer; *I-M*: Intervention-male; *I-F*: Intervention-female; *FG-CAM*: Focus Group-Campeche; *FG-BCS*: Focus Group-Baja California Sur; *FG-MOR*: Focus Group-Morelos; *SB*: Suicidal behavior; *CAISA*: Comprehensive Care Center for Adolescent Health.

concerns, and *SB*. Although they admitted that they would like to have a trusting environment at school where they could discuss their experiences and seek help, they were afraid that the information they provided would be shared with their caregivers or that they might be judged for what they expressed (Table 3).

Table 4
Life skill workshops: perceptions and suggestions from adolescents participating in focus groups

Analytical axes	*Sample uote*
Importance	*I-F*: The truth is I do want to have that skill of knowing how to communicate especially with my mother because sometimes I'm afraid of what she'll think because, yes, there are times when she tells me that "Oh, it's normal that you feel that way," so then it's a little frustrating. (*GF-CAM-02*)
	Interv: Do you think that these types of topics help us in our lives in some way? *I-M*: Yes. *Interv*: Like in what? *I-M*: Like in knowing how to act in these situations. *I-F*: And also, to help people in a situation. *Interv*: Like in what situation? *I-F*: Like in knowing if someone is stressed, knowing how they react. (*GF-MOR-06*)
Topic suggestions	*Interv*: Like what kind of topics would you like to be discussed in these workshops? *I-F*: Hmmm, I don't know, trusting parents. *Interv*: Another topic? *I-F*: Understanding parents. *I-F*: Communicating with your parents. (*GF-MOR-05*)
	Interv: What do you think can be done to improve these types of things? *I-F*: That a person, some person, someone makes my parents understand that maybe I want to talk with them and tell them something and that they understand me and that they listen to me, that they understand me. (*GF-CAM-04*)
Strengthen the bond with peers	*I-M*: That's right. Why? Because he feels confident to say "Ah, he's someone my age, I'm going to joke with him, I'm going to have a talk, and later we're going to talk about what interests me." That's what I mean: a guy [that says] "Ah, it's another guy," blah blah blah, and in between jokes, the truth appears. That's what I mean. I think that right now you don't listen to an adult, you listen to a person you trust [in]. I think that's what happens. (*GF-CAM-02*)
	I-F: I think it would be to sit down [it's a matter of sitting down] with the person you trust most and, between the two of us, tell each other your problems to let off steam. It could be like that. (*GF-MOR-05*)

Note: *Interv*: Interviewer; *I-M*: Intervention-male; *I-F*: Intervention-female; *FG-CAM*: Focus Group-Campeche; *FG-BCS*: Focus Group-Baja California Sur; *FG-MOR*: Focus Group-Morelos.

Perceptions and suggestions from students regarding the LS workshops

Students remarked that they had never previously had a space where they could talk about SB or social skills. In their opinion, having these skills would have practical repercussions in their everyday lives including their relationship with their parents and helping their classmates. They also made suggestions about the way they would like to receive information, and what kind of activities, dynamics or games they enjoyed although they added that games could create distractions.

Finally, the participants suggested topics, such as trust and communication with parents, which could be incorporated into the workshops. They highlighted the need to address the establishment of stronger bonds of trust between peers, since communicating with the latter gave them a sense of release (Table 4).

DISCUSSION AND CONCLUSION

The main contribution of this research is that it presents and interprets the Life Skills (LS) experiences of adolescent students in relation to suicidal behavior (SB). This information will serve as a reference for the forthcoming implementation of an educational initiative based on the LS approach. The results revealed that the students had only marginally developed the skills explored, highlighting the urgent need to implement LS interventions at schools.

Evidence suggests that student mental health improves as a result of educational interventions based on the LS approach in school settings (Fenwick-Smith et al., 2018; Pannebakker et al., 2019; Singla et al., 2020).

Encouraging results have been reported from several educational interventions promoting LS not only to improve mental health, but also to prevent SB (González-Cruz, et al., 2023; Jegannathan et al., 2014; Yen et al., 2023). Moreover, LaFromboise & Lewis (2008) obtained positive results when implementing the LS approach considering the sociocultural context[s] of adolescents belonging to specific ethnic groups.

The results of this research show that decision-making is usually mediated by adults, with students only being able to make decisions about immediate, everyday situations. This differs from other studies, which have found that adolescent decision-making is influenced by their interaction with others, particularly with friends or peers (Be et al., 2021). As regards problem-solving and conflict resolution, we found that negotiations between adolescents and adults tend to be asymmetrical, with adults usually having the upper hand.

The most frequently reported emotions were negative, such as anger, sadness, and frustration. The range of emotional regulation patterns was limited, with adolescents

often isolating themselves, crying, or responding violently. For Di Giunta et al. (2022), these patterns occur in young people who feel neglected at home or whose parents insist their children do exactly as they are told. These patterns lead adolescents to believe they are incapable of dealing with their emotions, representing an area of opportunity for interventions that provide emotional management tools.

Importantly, we found that students consistently reported a lack of spaces in which to talk about their emotions or personal problems and were reluctant to discuss them at school for fear that they might be judged or that their parents could find out. These findings are consistent with the experiences of this age group in another study (Díaz-Alzate & Mejía-Zapata, 2016).

In the context of suicide prevention, LS have a protective effect as they have been associated with increased life satisfaction and healthy family functioning including effective communication (Ram et al., 2020). Regarding knowledge about SB, adolescents generally perceive themselves as skilled at identifying peers at risk of SB.

Efforts to implement the LS approach with adolescents at school must consider involving the entire school community in the process, including parents/caregivers and everyone else who comes into direct contact with the students. It has been reported that adolescents who live with their parents or have a parent with high educational attainment score better in problem-solving and conflict resolution (negotiation), self-esteem, creative thinking, and coping with stress than those who do not (Buch et al., 2021). Likewise, school environments have been found to be spaces of opportunity for working with the adolescent population and contributing to the development and implementation of LS to enhance their mental health. Moreover, operating in the school setting helps reduce barriers often encountered by students and their families, such as travel time and costs, preventing the stigma that commonly emerges when seeking mental health services in the community (Xu et al., 2020). Active participation by teachers and administrative staff in LS efforts is therefore also recommended.

The results obtained in the focus groups highlighted the differences between students at the participating schools. Subsequent studies must endeavor to achieve a deeper understanding of the contexts where adolescents develop. Research has found that factors beyond the individual can influence the development of LS and must be considered to develop relevant initiatives (Díaz-Alzate & Mejía-Zapata, 2016). A recent study of adolescent students observed differences between rural and urban contexts regarding the status of LS development, while the socioeconomic status and sex of participants also exerted an influence (Contini et al., 2013).

It is worth noting that the meaning students from Campeche attributed to SB as a "way out" (solution) rather than a way of thinking differed from that of students from Morelos and Baja California Sur. This divergence can be explained through the socio-cultural context with a profound Maya influence in the Yucatan peninsula, where suicide can be seen as a way out of everyday problems (Hernández, 2010).

Determining students' degree of LS prior to conducting educational interventions provides valuable information for designing these initiatives. It also makes it possible to incorporate the specific socioeconomic conditions and cultural contexts of students, and their families and schools.

The patterns of emotional regulation commonly displayed by adolescents require intervention programs to enhance their skills for containing emotions and preventing self-harm. They also require information strategies to enable them to conceptualize SB accurately. However, it is essential to take steps to raise awareness of this issue among parents as well.

One limitation of this study was the lack of contact with students prior to the FGs, which limited the establishment of trust between the research team and participants. This restricted the amount of information obtained from certain FGs.

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Conflicts of interest

The authors declare they have no conflict of interest.

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Results of the DBT-MXAU Program for Suicide Prevention among Mexican Adolescents: A Quasi-experimental Study

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ABSTRACT

Introduction. Suicide and self-harming behaviors pose a significant challenge to adolescent psychosocial well-being, constituting the fifth leading cause of death worldwide among those aged 10 to19. In Mexico, the suicide rate among adolescents aged 15 to 19 is rising, highlighting the need for preventive interventions. **Objective.** To evaluate the effectiveness of the DBT-MXAU program, a cultural adaptation of Dialectical Behavior Therapy skills, in reducing suicide risk and improving emotional regulation in Mexican middle school adolescents in urban settings with high social vulnerability. **Method.** A multicenter, quasi-experimental design with pre-treatment and post-treatment assessments in three states of Mexico. Participants included 60 adolescents aged 13 to 17 (*M* = 15.23, *SD* = 1.59), who attended 11, two-hour weekly sessions of the DBT-MXAU program. **Results.** Findings showed a significant reduction in low and moderate suicide risk levels and improvements in emotional clarity and regulation. Adolescents with high suicide risk reported greater use of DBT skills. However, impact varied across regions. **Discussion and conclusion.** This study supports the effectiveness of the DBT-MXAU program in reducing low- and moderate-level suicide risks and improving emotional skills in adolescents. The results contribute to the development of evidence-based preventive strategies for urban school contexts in Mexico.

Keywords: Suicide prevention, adolescents, Dialectical Behavioral Therapy, emotional regulation, school-based interventions.

RESUMEN

Introducción. El suicidio y los comportamientos autolesivos representan un desafío significativo para el bienestar psicosocial de los adolescentes, siendo la quinta causa de muerte a nivel mundial en personas de 10 a 19 años. En México, la tasa de suicidio entre adolescentes de 15 a 19 años va en incremento, destacando la necesidad de intervenciones preventivas en contextos escolares urbanos. **Objetivo.** Evaluar la efectividad del programa DBT-MXAU, una adaptación cultural de las habilidades de la Terapia Dialéctica Conductual, para reducir el riesgo de suicidio y fortalecer la regulación emocional en adolescentes mexicanos de secundaria en entornos urbanos con alta vulnerabilidad social. **Método.** Se llevó a cabo un diseño cuasiexperimental multicéntrico con evaluaciones pre y postratamiento en cuatro ciudades de tres estados de México. Participaron 60 adolescentes, de entre 13 y 17 años (*M* = 15.23, *SD* = 1.59), quienes asistieron a 11 sesiones semanales de dos horas del programa DBT-MXAU. **Resultados.** Los hallazgos mostraron una reducción significativa en los niveles de riesgo suicida bajo y moderado, además de mejoras en la claridad y regulación emocional. Los adolescentes con alto riesgo de suicidio reportaron mayor uso de habilidades DBT. **Discusión y conclusión.** Este estudio respalda la efectividad del programa DBT-MXAU para reducir riesgos suicidas bajos y moderados y mejorar las habilidades emocionales en adolescentes. Los resultados contribuyen al desarrollo de evidencia de estrategias preventivas en contextos educativos en México.

Palabras clave: Prevención del suicidio, adolescentes, Terapia Dialéctica Conductual, regulación emocional, intervenciones en contextos escolares.

INTRODUCTION

Globally, suicide claims the lives of 45,800 adolescents annually, making it the fifth leading cause of death among individuals aged 10 to 19, the fourth among males aged 15 to 19, and the third among females in the same age group (Fondo de las Naciones Unidas para la Infancia [UNICEF], 2022). In Mexican adolescents aged 15 to 19, the suicide rate totaled 7.7 per 100,000 in 2022, compared to 3.6 in 2017, representing a 114% increase over six years (Instituto Nacional de Estadística y Geografía [INEGI], 2018; 2023). According to UNICEF (2020), eight out of ten youth suicides occur in school settings, making them ideal for the implementation of universal suicidal prevention interventions (Pan American Health Organization, 2023).

Dialectical Behavioral Therapy (DBT), developed by Linehan (1993), is the first treatment for which there is strong evidence that it effectively addresses issues related to dysregulated behaviors, cognition, and emotions (American Psychological Association, 2022), including suicidal behavior. Meta-analyses of the effectiveness of DBT demonstrate that it helps individuals reduce suicidal and self-injurious behaviors, decreases the need for specialized psychiatric services, and reduces treatment dropout rates (DeCou et al., 2019; Panos et al., 2014). Asarnow et al. (2021) found that DBT improved emotional regulation and the use of practical coping skills in adolescents who had attempted suicide. Hermosillo-de-la-Torre et al. (2023) recently obtained comparable results by using a DBT skills program as independent treatment for Mexican adolescents in the initial stages of suicidal thoughts. According to Neacsiu et al. (2014), DBT skills training seeks to equip individuals with empirically grounded strategies to accurately identify and label emotions, decrease emotional vulnerability, modulate emotional intensity, and navigate high-stress situations without resorting to self-destructive behaviors.

Based on previous findings, this study aims to evaluate whether the DBT skills program adapted for Mexican adolescents in school settings reduces the level of suicide risk. Additionally, it seeks to determine whether the use of DBT skills enhances emotional regulation and contributes to the reduction of suicide risk in a sample of Mexican adolescents from three Mexican states.

METHOD

Study design

Researchers implemented a multicenter, quasi-experimental, quantitative, pre-post design (Shadish et al., 2002) across four cities in three states in Mexico: La Paz, Baja California Sur; Ciudad del Carmen, Campeche; San Francisco de Campeche, Campeche; and Cuernavaca, Morelos.

Participants

The current study is part of a larger national project approved by the Ministry of Science, Humanities, Technology, and Innovation (SECITHI). It aims to evaluate the effectiveness of three psychoeducational interventions designed to reduce suicide risk among Mexican adolescents attending public middle schools in marginalized urban areas. The researchers conducted the study in three distinct phases. In Phase 1, we screened for risk factors associated with suicide and substance use in middle schools across six states selected for convenience (Figure 1). In Phase 2, we trained state mental health personnel in the intervention programs. In Phase 3, we implemented the intervention programs. This study focuses on the DBTMXAU intervention with four groups assigned to this study located in four cities across three states.

Sixty adolescents aged between 13 and 17 (M = 15.23, SD = 1.59) participated (45% of whom were female, and 53% male, while 2% preferred not to disclose their gender).

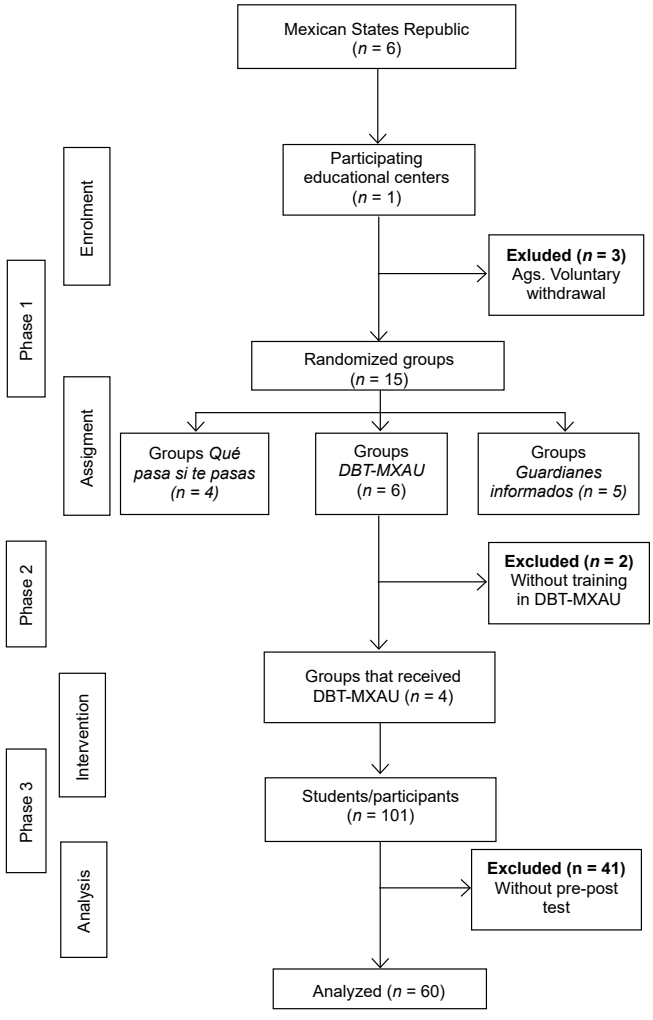

Figure 1. Participant flow.

Participants were enrolled in the third year of middle school. The inclusion criteria were a) being a regular student at the participating school, b) having granted consent to participate in the study, and c) having parental consent.The exclusion criteria were as follows: a) refusal to provide informed consent for participation in the study; b) incomplete or inadequate completion of pre- and post-intervention assessments; c) attendance at fewer than 80% of intervention sessions; and d) presence of hearing or visual impairments.

Measurements

1. *Trait Meta-Mood Scale 24 items* (*TMMS-24*). Adapted for Mexican adolescents by Ocaña et al. (2019), this scale evaluates the perception of socio-emotional skills through three dimensions: a) emotional attention (the degree to which people pay attention to their emotions and feelings); b) emotional clarity (the ability to understand one's emotional states); and c) emotional repair (the capacity to regulate and manage emotional states appropriately). It is a 5-point Likert scale, where 1 indicates "strongly disagree" and 5 indicates "strongly agree." The overall scale had internal consistency, with a Cronbach's Alpha coefficient of α = .910. In the current study, we obtained an α of .87 for the pre-test and .85 for the post-test. The dimensions also exhibited good psychometric properties, with alphas of .85 in emotional attention, .87 in emotional clarity, and .87 in emotional repair.
2. *Dialectical Behavioral Skills Scale* (*EHSE-DBT*). Developed by Acevedo (2021) to assess the use of DBT socio-emotional skills in Mexican adolescents, this scale contains 37 items (six for mindfulness, six for distress tolerance, 15 for emotional regulation, and 10 for interpersonal effectiveness). It includes an Osgood rating scale, in which each item contains bipolar adjective pairs on a scale of 1 to 4, with 1 representing one extreme of a concept and 4 the other. The scale demonstrated acceptable reliability in both pre-assessment and post-assessment, with α values of .80 and .81, respectively.
3. *The Columbia Suicidality Severity Rating Scale* (*C-SSRS*). Developed by Posner in 2008 (no existe link al PDF), identifies individuals at risk of suicide. We used the Spanish version in a self-report format for Chilean adolescents, following the method used by Núñez et al. (2019). The scale comprises seven questions with dichotomous answers: yes or no. We assessed individuals as having low suicide risk if they answered questions 1 and 2 affirmatively. An affirmative answer to question 6 indicated moderate risk, while affirmative answers to questions 4, 5, and 7 were classified as high risk. The analysis showed that the scale had high reliability, with a KR-20 score of .88 for the pre-evaluation and .91 for the post-evaluation after we eliminated question 3.

Procedure

We implemented the DBT-MXAU program with teams of designated mental health professionals from May to July 2023. A total of sixteen psychologists from the mental health sector (12 women and four men) administered the DBT-MXAU program between September and December 2023 in four regions: Morelos (n = 5), Baja California Sur (n = 2), Ciudad del Carmen (n = 6), and San Francisco de Campeche (n = 3). The research team delivered the Educational Transfer Program through an online course hosted on the Moodle platform at https://prevenirelsuicidioadolescente.org. A psychologist recognized by Behavioral Tech taught the course. The training, comprising six asynchronous modules with reading, videos, and practical exercises, focused on the theoretical, epistemological, and operational foundations of DBT. We also conducted eight weekly synchronous sessions during the training. We provided continuous support to facilitators through a WhatsApp group and video calls for answering questions in real time.

The intervention program consists of 11 sessions, the first two being designed to inform and engage participants. It includes two sessions in each skill module, (mindfulness, distress tolerance, emotional regulation, and interpersonal effectiveness). Each session, lasting two hours, features a facilitator and a co-facilitator and follows a structured format that incorporates mindfulness activities, skill reviews, teaching, and homework assignments. The intervention includes a welcome session, four thematic modules, and a closing session, adopting the theoretical and methodological approach of DBT. We developed two key resources as supporting materials, (1) The Guidelines and Framework for DBT-MXAU Trainers, a 190-page guide including theoretical foundations, the program structure, and recommendations for its implementation in school settings, and (2) The DBT-MXAU Skills Training Manual, adapted by Hermosillo-de-la-Torre et al, (2025), which introduces the skills through simple explanations, examples, generalization activities, and visual resources designed for adolescents. This booklet presents DBT-A (Rathus & Miller, 2014) and DBT Skills (Linehan, 2014) specifically for Mexican adolescents experiencing high social vulnerability in urban school settings. During the implementation of the DBT-MXAU program, facilitators actively conducted pre- and post-treatment assessments in both online and paper-and-pencil formats. These assessments measured emotional intelligence, the use of DBT skills, and suicide risk. In addition, we requested video recordings of the sessions

for supervision by the research team. After implementing the DBT-MXAU, we organized a meeting with the facilitators to obtain feedback on their experience with the implementation.

Statistical analysis

We conducted all statistical analyses using IBM SPSS Statistics (Version 20), setting a two-tailed alpha level of .05 for significance tests.

Descriptive statistics and prevalence estimates were calculated for sociodemographic, academic, and emotional variables, including means, standard deviations, and 95% confidence intervals. Prevalence rates of suicide risk (global, checklist, and crisis indices) were calculated and stratified by school, sex, and risk level (low, moderate, and high).

Due to the small sample size and non-normal distributions, we used Wilcoxon signed-rank tests to compare pre- and post-intervention scores on (a) the three suicide-risk indices and (b) the emotional intelligence subscales (attention, clarity, and repair), as well as the self-reported frequency of DBT skills. We calculated effect sizes using the formula $r = |Z| / \sqrt{N}$, interpreting them as small (.10), medium (.30), or large (.50).

The change in scores (Δ = post − pre) was calculated for each outcome and examined with the Kruskal–Wallis test across the four schools (three states). Effect magnitude was indexed by $\eta^2\_H = H / (N - 1)$ and classified as trivial (.01), small (.06), or medium (.14), according to Tomczak & Tomczak (2014).

The study assessed the relationships between the use of DBT skills, emotion regulation, and suicide risk following the intervention using Spearman's rho (ρ), interpreting effect sizes as small (.10), medium (.30), or large (.50).

We conducted ordinal logistic regressions using the PLUM procedure with a cumulative logit link. In Model A, we assessed whether the city of residence influenced the post-intervention suicide risk category. In Model B, we examined how the frequency of DBT skills and emotional repair after the intervention predicted risk categories, controlling for baseline risk. Each model included a test of parallel lines to verify the proportional odds assumption.

Ethical considerations

The Bioethics Committee of the National Institute of Public Health approved the study, with folio number CI:1742, Folio 107. We informed each participating adolescent and their parents about the goals and scope of the program. After they had understood the objectives, the adolescents voluntarily decided whether they wished to participate. Those who chose not to participate in the program, or decided to discontinue their attendance, were given alternative activities determined by school authorities. Additionally, we referred adolescents identified as being at high risk for suicide to appropriate psychological care services through the Ministry of Health.

RESULTS

A series of Wilcoxon signed-rank tests revealed that the DBT-MXAU produced meaningful reductions in suicide-risk indices. Students' overall risk scores declined significantly from pre-intervention to post-intervention, $Z = -2.84$, $p = .005$, $r = .40$, indicating a medium effect. A parallel analysis using the program-checklist (PC) risk indicator yielded a similar result, $Z = -2.71$, $p = .007$, $r = .38$. Conversely, crisis-specific suicide-risk scores remained unchanged, $Z = .00$, $p = 1.00$, $r = .00$. Together, these findings suggest that the intervention was effective in lowering general and checklist-based suicide risk yet failed to modify crisis-level risk in this sample of Mexican adolescents. DBT skills frequency remained stable whereas global emotional intelligence rose significantly. According to Cohen's benchmarks, the significant effects were small to medium in magnitude (Table 1).

The Kruskal–Wallis tests showed that post-intervention outcomes varied as a function of participants' city of residence (four groups). None of the contrasts achieved statistical significance: overall suicide-risk scores, χ^2 (2) = .99, $p = .61$; global emotional-intelligence scores, χ^2 (3) = 2.09, $p = .56$; emotional attention, χ^2 (3) = 1.40, $p = .71$; emotional clarity, χ^2 (3) = .63, $p = .89$; emotional repair, χ^2 (3) = 4.24, p = .24; checklist-based attention, χ^2 (3) = .78, $p = .85$; checklist-based clarity, χ^2 (3) = 2.13, $p = .55$; checklist-based repair, χ^2 (3) = 2.17, $p = .54$; and overall DBT-skills frequency, χ^2 (3) = 2.30, $p = .51$. (Table 2).

Spearman's rank-order correlations showed positive interrelations among the emotion-regulation facets: global

Table 1
Pre–post changes in suicide risk, emotion regulation, and DBT-skills (Wilcoxon signed-rank tests)

Variable	*Z*	*gl*	*p*	*r*	*Magnitude*
Global suicide risk	−2.84	49	.005	.40	Medium
Checklist suicide risk	−2.71	49	.007	.38	Medium
Crisis suicide risk	.00	51	1.000	.00	None
Emotional intelligence (global)	−2.42	55	.015	.32	Medium
Emotional attention	−1.12	56	.264	.15	Small
Emotional clarity	−2.75	57	.006	.36	Medium
Emotional repair	−2.29	56	.022	.30	Medium
DBT-skills frequency	−.76	58	.445	.10	Small

Note: N = gl + 1 for each test. Effect size $r = |Z| / \sqrt{N}$. Magnitude benchmarks follow Cohen (1988). *ns* = non-significant.

Table 2
Post-intervention differences by city (Kruskal–Wallis tests)

Variable	*H*	*gl*	*p*	*η²_H*	*Magnitude*
Overall suicide risk	.99	2	.609	.02	Trivial
Emotional intelligence (global)	2.09	3	.555	.04	Trivial
Emotional attention	1.40	3	.706	.03	Trivial
Emotional clarity	.63	3	.889	.01	Trivial
Emotional repair	4.24	3	.237	.08	Small
DBT-skills frequency	2.30	3	.512	.04	Trivial

Note: η²_H = H / (N − 1); Benchmarks: .01 = trivial, .06 = small, .14 = medium (Tomczak & Tomczak, 2014).

emotional intelligence correlated with emotional attention (ρ = .87, p < .001), clarity (ρ = .84, p < .001), and repair (ρ = .84, p < .001), and the subscales themselves were moderately intercorrelated (ρs = .57–.62, all ps < .001). Higher scores on several emotion-regulation indices were associated with lower suicide risk levels. Emotional clarity correlated negatively with both overall suicide risk (ρ = –.30, p = .031, n = 52) and crisis-level risk (ρ = –.35, p = .009, n = 55), while emotional repair showed a similar inverse association with crisis-level risk (ρ = –.32, p = .016, n = 55). Global emotional intelligence displayed small but significant negative links to overall risk (ρ = –.28, p = .047) and crisis-level risk (ρ = –.35, p = .009). In contrast, emotional attention was unrelated to either suicide risk ($|\rho| \leq .21$, $ps > .11$). Post-intervention DBT-skills frequency did not correlate with global emotion-regulation scores ($|\rho| \leq .06$, $ps > .70$) or overall suicide risk (ρ = –.01, p = .964). (Table 3).

An ordinal logistic regression was conducted to determine whether the city of residence influenced adolescents' suicide risk levels following the intervention. The analysis included a total of 52 valid cases. Model fit statistics indicated that adding the predictor failed to enhance the intercept-only model, as shown by $\Delta\chi^2$ (1) = .03, p = .873, resulting in a negligible amount of explained variance (Nagelkerke R^2 = .001). Overall, the model fit was deemed acceptable, (χ^2 = 2.00, df = 3, p = .572, and Deviance χ^2 = 2.93, df = 3, p = .403).

The location parameter for the city of residence was not significant, with a coefficient of b = -.08, standard error (SE) = .52, Wald χ^2 (1) = .03, p = .874, and a 95% confidence interval of [−1.11, .94], corresponding to an odds ratio of .92.

An ordinal logistic regression suggested that post-intervention DBT-skills frequency (HDBT_POST) and emotional repair (REP_E_POST) predicted adolescents' suicide-risk category (RS_POST_1; 0 = no risk, 1 = low risk, 2 = moderate risk). The outcome was markedly skewed (90.4 % in the no-risk category), resulting in 66.7 % empty predictor–outcome cells. Nevertheless, overall model fit was adequate (Pearson χ^2 = 84.52, df = 98, p = .832; Deviance χ^2 = 33.63, df = 98, p = 1.000). Adding the two predictors did not improve the intercept-only model, $\Delta\chi^2$ (2) = 4.30, p = .117, and explained little variance (Nagelkerke R^2 = .15). Neither DBT-skills use, b = .04, SE = .03, Wald χ^2 (1) = 1.74, p = .187, 95 % CI [−.02, .09], OR = 1.04, nor emotional repair, b = −.10, SE = .06, Wald χ^2 (1) = 2.61, p = .106, 95 % CI [−.23, .02], OR = .90, emerged as significant predictors of being classified in a higher suicide-risk category. (Table 4).

Table 3
Spearman correlations between emotion regulation, DBT skills, and suicide risk

Variable pair	*P*	*df*	*p*	*Magnitude*
EI global ↔ Global suicide risk	−.28	50	.047	Small–Medium
EI global ↔ Crisis suicide risk	−.35	53	.009	Medium
Emotional clarity ↔ Global suicide risk	−.30	50	.031	Medium
Emotional clarity ↔ Crisis suicide risk	−.35	53	.009	Medium
Emotional repair ↔ Crisis suicide risk	−.32	53	.016	Medium
DBT-skills freq. ↔ Crisis suicide risk	.27	54	.047	Small

Note: df = N − 2. Magnitude benchmarks: $|\rho| \approx .10$ small, .30 medium, .50 large (Cohen, 1988).

Table 4
Ordinal logistic regression predicting post-intervention suicide risk

Predictor	*B*	*SE*	*Wald χ²*	*P*	*OR*	*95% CI for OR*
City (Model A)	−.08	.52	.03	.874	.92	.33–2.57
DBT-skills frequency (post)	.04	.03	1.74	.187	1.04	.98–1.09
Emotional repair (post)	−.10	.06	2.61	.106	.90	.80–1.02

Note: Model fit indices
Model A: $\Delta\chi^2$ (1) = .03, p = .873; Nagelkerke R^2 = .001; Pearson χ^2 (3) = 2.00, p = .572 Deviance χ^2 (3) = 2.93, p = .403.
Model B: $\Delta\chi^2$ (2) = 4.30, p = .117; Nagelkerke R^2 = .15; Pearson χ^2 (98) = 84.52, p = .832 Deviance χ^2 (98) = 33.63, p = 1.00.
Parallel lines assumption not violated in either model (all p > .40).

DISCUSSION AND CONCLUSION

The present study offers partial yet clinically meaningful evidence of the effectiveness of the DBT-MXAU skills program in Mexican secondary-school settings. Consistent with DBT theory (Linehan, 1993), global suicide-risk scores declined with medium effect sizes (Z = −2.84, p = .005, r = .40), as did checklist-based risk (Z = −2.71, p = .007, r = .38). These reductions meet Cohen's (1988) threshold for clinically relevant change.

Improvements in emotion regulation skills emerged in parallel with risk reduction. Global emotional intelligence, clarity, and repair each increased with medium effect sizes ($Zs = -2.42$ to -2.75, $rs = .30 – .36$), while post-intervention correlations showed that greater emotional clarity and repair were modestly yet significantly associated with lower suicide risk (for example, clarity with crisis risk: $\rho = -.35$, $p = .009$). These findings support the biosocial model's contention that the ability to label and modulate emotional states buffers suicidal impulses. Contrary to expectations, self-reported frequency of DBT-skills use neither increased significantly ($Z = -.76$, $p = .445$, $r = .10$) nor predicted lower risk ($\rho = -.01$, $p = .964$). The absence of a protective association suggests that raw frequency counts fail to capture the quality of skill implementation, as noted in a previous study distinguishing declarative knowledge from behavioral competence (Neacsiu et al., 2014).

Program effects appeared consistent across geographic contexts. Results revealed only trivial post-intervention differences between the four participating cities ($\eta^2\_H \leq .08$), implying that DBT-MXAU achieves a comparable impact on diverse urban settings and may therefore be scalable within the national school system. Multivariate results, however, were constrained by a pronounced floor effect: approximately 90% of adolescents were classified in the "no risk" category after treatment, leaving insufficient variance for the ordinal logistic models. Neither city of residence ($OR = .92$, 95, CI .33, 2.57) nor the combination of post-program skills frequency ($OR = 1.04$, CI .98, 1.09) and emotional repair ($OR = .90$, CI .80, 1.02) predicted higher risk categories, and two-thirds of the predictor–outcome cells were empty, further reducing statistical power. Future research using randomized controlled trials (RCTs) will be necessary to confirm these findings and evaluate the impact of the intervention more effectively.

Several limitations temper the interpretation of these findings. First, the floor effect restricted both the detection of predictors and the estimation of effect sizes, indicating a need for samples with greater baseline variability in suicide risk. Second, reliance on self-reporting may have introduced social-desirability bias and recall error, particularly in the frequency-of-skills measure. Third, the pre-post design without follow-up makes it impossible to draw conclusions about gains maintenance or the temporal ordering of mechanisms (skill use → improved regulation → reduced risk). Fourth, small site-level samples limited the ability to conduct more granular moderation analyses. Fifth, the study did not control for potentially influential social variables (such as socioeconomic status, family environment, or previous mental health support), which may have affected both baseline risk levels and the response to the intervention. Future studies should account for these factors to clarify the specific impact of the DBT-MXAU program.

Despite these constraints, the results have meaningful implications for practice and future research. Enhancing in-vivo coaching, performance feedback, and ecological assessments could help translate skill frequency into functional mastery and capture real-time deployment. Longitudinal designs testing mediational chains between changes in skill competence, emotion regulation, and suicide risk would clarify causal pathways. Larger, multi-site samples or cluster-randomized trials could alleviate power limitations and allow the examination of school-level moderators.

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Conflicts of interest

The authors declare they have no conflict of interest.

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Suicide-Related Outcomes Among Adolescent Clinical Populations: The Effect of Sex on Preventive Factors

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ABSTRACT

Introduction. Suicide-related outcomes (SROs), such as ideation and attempts, are among the leading causes of mortality in adolescents in clinical settings. Developing culturally and sex-specific strategies to identify high-risk adolescents is crucial for enabling immediate preventive interventions. **Objective.** To compare adolescents' sociodemographic and clinical characteristics with (non)-SROs and (ideation/attempt)-SROs, stratified by sex, and to analyze their relationship with psychopathology factors. **Method.** A cross-sectional, multi-informant study was conducted using consecutive sampling during routine clinical visits and an assessment tool collected sociodemographic, clinical, general severity, and overall functioning data. Differences between groups were analyzed, and exploratory factor analysis was performed to identify latent psychopathology factors. **Results.** Males exhibited significantly more (ideation/attempt)-SROs than females (n = 143, 58 [40.56 %] *vs*. n = 158, 52 [32.91 %], U = 7585.5, p = .0135). In (ideation)-SROs, males had higher total psychopathology scores, while females scored significantly higher in internalized and neurodevelopmental factors. In (attempt)-SROs, females showed higher scores in psychotic factors. **Discussion and conclusion.** Adolescents with (ideation/attempt)-SROs presented higher psychopathology levels. Whereas males reported more SROs overall, females scored higher in internalized symptoms. Recognizing internalized and neurodevelopmental factors may enhance early detection and prevention efforts, particularly in adolescent females.

Keywords: Suicidal behavior, children, adolescents, sex differences, factorial analysis, mental health outcomes.

RESUMEN

Introducción. Los desenlaces relacionados con el suicidio (RRSs), como la ideación e intentos, son una de las principales causas de mortalidad en adolescentes en entornos clínicos. Es crucial desarrollar estrategias basadas en la cultura y el sexo para identificar a quienes presentan mayor riesgo y posibilitar intervenciones preventivas inmediatas. **Objetivo.** Comparar características sociodemográficas y clínicas de adolescentes con (no)-RRSs y con (ideación/intento)-RRSs, estratificados por sexo, y analizar su relación con factores de la psicopatología. **Método.** Se llevó a cabo un estudio transversal, multiinformante, con muestreo consecutivo en visitas clínicas regulares. Se utilizó una herramienta de evaluación con variables sociodemográficas, clínicas, gravedad general y funcionamiento global. Se analizaron diferencias entre grupos y se aplicó análisis factorial exploratorio para identificar factores latentes de psicopatología. **Resultados.** Los hombres presentaron más (ideación/intento)-RRSs que las mujeres (n = 143, 58 [40.56 %] *vs*. n = 158, 52 [32.91 %], U = 7585.5, p = .0135). En (ideación)-RRSs, los hombres mostraron mayor psicopatología total, mientras que las mujeres obtuvieron puntajes significativamente más altos en factores internalizados y de desarrollo neurológico. En (intento)-RRSs, las mujeres reportaron puntajes más elevados en factores psicóticos. **Discusión y conclusión.** Los adolescentes con (ideación/intento)-RRSs presentan mayor psicopatología. Aunque los hombres reportaron más RRSs, las mujeres mostraron puntajes más altos en síntomas internalizados. Identificar factores internalizados y de desarrollo neurológico podría mejorar la detección temprana y prevención en adolescentes, especialmente mujeres.

Palabras clave: Conducta suicida, niños, adolescentes, diferencias por sexo, evaluación factorial, salud mental.

INTRODUCTION

Suicide-related outcomes

Suicide-related outcomes (SROs), including ideation and attempts, are the leading cause of mortality among adolescents worldwide (American Psychiatric Association [APA], 2013; Hua et al., 2024). Adolescence is a developmental stage marked by psychological, emotional, and social changes, increasing susceptibility to psychiatric symptoms (Borges et al., 2008). Early detection of and intervention in SROs are essential, as timely recognition provides a unique opportunity for preventive attempts before these behaviors escalate (Wasserman et al., 2021). Evidence has consistently demonstrated the effectiveness of early, targeted interventions in mitigating suicide risk, emphasizing the importance of implementing systematic detection strategies in clinical settings (Ajluni & Amarasinghe, 2024).

In Mexico, epidemiological studies indicate that approximately 12% of adolescents experience suicidal ideation, while 3% attempt suicide (Borges et al., 2007).However, national data on SROs often fail to explain the role of contextual factors, such as family dynamics, social stressors, and cultural influences, which may contribute to risk escalation. It is therefore essential to recognize culturally and sex-specific characteristics to identify adolescents at high risk, particularly in clinical settings where immediate intervention is possible.

Studies have documented the steady increase in SROs. An eight-year follow-up of Mexican adolescents revealed incidence rates of nearly 10% for suicidal ideation and approximately 5% for attempts, highlighting the tendency for these behaviors to develop over time. A study by Benjet et al. (2018) found that risk factors such as adverse childhood experiences, school absenteeism, and substance use were associated with a 30% increase in the likelihood of developing SROs. Furthermore, psychiatric comorbidities, mainly internalized disorders, were correlated with the persistence of SROs, while externalized disorders were associated with the transition from ideation to attempts (Benjet et al., 2018). These findings demonstrate the relationship between psychopathology and psychosocial stressors, emphasizing the need for culturally informed, evidence-based prevention strategies.

Tools for assessing suicide-related outcomes

Given the multifactorial nature of SROs, tools such as the Brief Psychiatric Rating Scale for Children and Adolescents (BPRS-CA) offer a comprehensive framework for their evaluation. The BPRS-CA assesses key psychopathological domains, internalizing, externalizing, and neurodevelopmental factors strongly associated with SROs in adolescents (Lachar et al., 2001). Internalizing factors include symptoms such as depression and anxiety, while externalizing factors encompass impulsivity and aggression, and neurodevelopmental domains comprise issues such as cognitive deficits and social communication problems. By providing detailed profiles of these domains, the BPRS-CA improves early risk identification, enabling tailored interventions for high-risk adolescents (Hofmann et al., 2022).

Cultural validation of the BPRS-CA for use in Mexican and other Spanish-speaking populations has been studied in adults (Sánchez et al., 2005). This instrument has also demonstrated strong inter-rater reliability (α = .85) and moderate test-retest reliability (r = .65) in adolescents, confirming its utility for longitudinal monitoring of changes in psychopathology. Moreover, the BPRS-CA framework aligns with modern psychiatric approaches that conceptualize symptoms along a continuum of factors rather than as discrete categories, facilitating the detection of subtle yet clinically significant shifts in symptom severity (de la Peña et al., 2005). However, while the tool is comprehensive, additional research on its specific application to SROs in adolescent clinical populations could enhance its diagnostic utility. For example, sex differences provide data on risk patterns. Research indicates that females have an increased risk of (attempt)-SROs compared to males (*OR* 1.96, 95% *CI* 1.54–2.50), though data specific to males in Mexican populations remain limited (Miranda-Mendizabal et al., 2019). This study could therefore contribute to understanding sex differences related to SROs status among Mexican adolescents.

The objectives of this study were to compare the sociodemographic and clinical characteristics of Mexican adolescents between non-SROs and SROs and by sex. We also aimed to identify the factor integration and load of the SROs item in the BPRS-CA-29, predict the BPRS-CA-29 SROs items for internalizing, externalizing, neurodevelopmental, and psychosis factors, determine the influence of each BPRS-CA-29 factor within non-SRO and SRO groups, compare these predictions across sexes, and finally, establish the relationship between each BPRS-CA-29 factor and sex.

METHOD

Study design and timeframe

This cross-sectional, multi-informant study was conducted between April 2016 and July 2019 at the Adolescence Clinic of the Instituto Nacional de Psiquiatría Ramón de la Fuente Muñiz (INPRFM) in Mexico City, Mexico.

Sample

Adolescents between the ages of 13 and 17 were enrolled using consecutive sampling during routine clinical visits at the INPRFM Adolescence Clinic.

Measurement instruments

Brief Psychiatric Rating Scale for Children and Adolescents–Present and Lifetime Version

Psychopathological symptoms were assessed using the Brief Psychiatric Rating Scale for Children and Adolescents–Present and Lifetime Version (BPRS-CA), a valid instrument with strong inter-rater reliability (α = .80) and moderate test-retest reliability (r = .65) (Mullins et al., 1986).

The present study used the BPRS-CA-29 adapted for the Mexican population, with 29 items rated on a Likert-type scale. This version expands on the former by incorporating diagnostic categories such as elimination disorders, substance use disorders, and abuse-related symptomatic outcomes. Factor analysis identified six psychopathological dimensions, including internalizing, externalizing, neurodevelopmental, and psychotic diagnostic continuums (de la Peña et al., 2005).

Suicide-related outcomes

Item 9 of the BPRS-CA-29 asks about suicide-related outcomes (SROs), defined as the adverse healthcare outcomes of both psychopathological and sociocultural determinants. In the previous item, a score of zero (0) denotes the absence of SROs, while scores of 1, 2, and 3 identify the degree of SROs. For example, a score of 1 refers to suicidal ideation, a score of 2 is associated with lifetime suicide intent or attempts, while a score of 3 denotes active suicide risk (de la Peña et al., 2005).

Clinical Global Impression

The Clinical Global Impression (CGI) Scale, developed by Busner & Targum (2007),, is a clinician-administered tool quantifying the presence and severity of psychopathology. It is scored in an ordinal format from zero (0) to six (6), with higher scores indicating worse symptom severity. Its validity has been widely confirmed in multiple samples, including Mexican ones (Busner & Targum, 2007).

Global Assessment of Functioning

The Global Assessment of Functioning (GAF) Scale is another clinician-administered instrument designed to measure overall functioning. This construct is defined by biological, psychological, social, cultural, academic, and occupational determinants related to daily living activities. Scores range from 0 to 100 and are divided into five intervals, with higher scores correlating with overall adaptive functioning. Like the CGI, the GAF has been validated for Spanish-speaking populations (Aas et al., 2010; Schorre & Vandvik, 2004).

Procedure

After initial screening, eligible candidates and their parents/guardians who met the research criteria were invited to participate. The research team then proceeded to explain the study objectives, procedures, potential risks, and benefits. If the candidate agreed to participate, parents/guardians were asked to provide written informed consent and adolescents were asked to provide assent. Sociodemographic and clinical data were subsequently collected via the initial screening module of the BPRS-CA-29. This section of the instrument gathers information on participants' age, sex, years of education, family structure and dynamics, as well as biopsychosocial antecedents such as previous medical care and treatment. Researchers then conducted the standardized, structured interview section of the BPRS-CA-29. This section collects data to identify and weigh psychiatric symptomatology across the previously mentioned diagnostic domains. Finally, symptom severity was measured with the CGI, and global functioning was measured with the GAF scale.

Statistical analysis

Descriptive statistics, including means and standard deviations, were computed for all sociodemographic and clinical variables across the three SRO categories: absent, ideation, and attempt. Given the non-normal distribution of variables resulting from subgroup stratification by sex and SRO status, Mann-Whitney U tests were used for group comparisons. This nonparametric approach was selected for its suitability for analyzing ordinal and non-normally distributed data. Although the dataset permitted factorial comparisons, non-normality and unequal subgroup sizes led us to prioritize non-parametric pairwise analysis using Mann–Whitney U. We assessed interaction effects between sex and SROs categories (Vermeulen et al., 2015).

An exploratory factor analysis (EFA) was conducted to examine the association between BPRS-CA-29 factors and SRO categories using principal axis factoring, which isolates shared variance while mitigating measurement error. Varimax rotation enhanced interpretability by maximizing variance concentration within each extracted factor. Factor loadings exceeding .30 were retained, consistent with established validation criteria (Tavakol & Wetzel, 2020).

Post-hoc pairwise comparisons of factor scores were conducted to explore intergroup differences, with p-values adjusted via the Benjamini-Hochberg procedure to control for multiple comparisons and minimize the false discovery rate while maintaining statistical power (Green & Diggle, 2007).

Factor scores for Item 9 of the BPRS-CA-29 (Suicidal Behavior): Thoughts about death, suicidal thoughts (threats or plans), and suicidal attempts were categorized as follows: 0 = Absent: Not at all; 1 = Mild: Only thoughts about death; 2 = Moderate: Recurrent thoughts or plans of suicide or an attempt occurring more than a month ago; 3 = Severe: Suicidal attempt in the past month. Previous scores were analyzed to measure psychopathological symptom clustering across SRO categories. Regression analyses were performed to model the relationships between identified psychopathological actors and SRO risk. A box plot analysis was conducted to visualize the distribution of SRO scores by sex and psychopathological factors, incorporating central tendency and dispersion measures, including the median, interquartile range, and extreme values. The 1.5 interquartile range rule was applied to detect and isolate outliers. All statistical analyses were conducted using R Studio (Version 23; R Studio Team, 2023), with statistical significance at $p < .05$.

Ethical considerations

This study complied with the ethical principles outlined in the Declaration of Helsinki, emphasizing ethical considerations for research involving adolescent populations. Written informed consent was obtained from parents or legal guardians, and adolescents were asked to provide assent to ensure voluntary participation. The study protocol underwent rigorous review and approval by the Institutional Research Ethics Board of INPRFM (CONBIOETICA-09-CEI-010-20170316). Participants diagnosed with active suicide risk during the study procedures were immediately attended to, and after the safe de-escalation of this risk, were asked if they wished to be transferred to the institutional emergency department for further specialized mental healthcare.

RESULTS

General sociodemographic and clinical characteristics

The sample comprised 301 adolescents, with a mean age of 15.26 ± 1.40 years (ranging from 13 to 18), while the mean number of completed school years was 10.19 ± 2.06 years (range .8 to 1.12).

Comparison between non-SRO and (ideation/attempt)-SRO groups and sex

The (ideation/attempt)-SRO group scored higher on the BPRS-CA-29 total scores (21.60 ± 5.15) than the non-SRO group (182 ± 4.23; $p < .001$), adjusting for sex differences. The age difference between the (non-SRO)-SRO and (ideation/attempt)-SRO groups was not statistically significant (15.15 ± 1.35 as opposed to 15.22 ± 1.42 years; $p = .570$). Participants in the (non-SRO) group had more non-statistically significant differences regarding years of schooling than those in the (ideation/attempt)-SRO group (10.24 ± 2.11 compared to 9.75 ± 2.12 years; $p = .120$).

The (ideation/attempt)-SRO group had a significantly higher psychopathological burden than the (non)-SRO group as measured with the BPRS-CA-29 total scores (21.60 ± 5.15 compared to 10.82 ± 4.23; $p < .001$). The (ideation/attempt)-SRO group also demonstrated increased symptom severity compared to the (non)-SRO group, measured with the CGI (4.59 ± 1.10 versus 3.73 ± 0.85; $p < .001$). Likewise, the (ideation/attempt)-SRO group reported lower (worse) overall functioning compared with the (non)-SRO group (51.44 ± 12.64 against 60.69 ± 13.80; $p = .010$).

Comparison between sociodemographic and clinical data by sex

The females in the (non)-SRO group were significantly older than the males. Females and males in both groups reported higher (or worse) total BPRS-CA-29 scores. No significant differences were found in either group regarding SROs, CGI, and GAF scores while controlling for sex differences. Detailed results are shown in Table 1.

Exploratory factor analysis

The EFA found four factors in the BPRS-CA-29 scores for the total sample: externalized, internalized, neurodevelopmental, and psychotic symptomatic dimensions. The variance in the ninth item of the instrument was loaded into the internalized dimension. Table 2 shows the factor loading of the 29 items.

Table 1
Descriptive sociodemographic and clinical by sex

Variable	*U*	n_1	n_2	*z*	*r*
BPRS-CA-29	2765.5	101	110	–6.296	.433
CGI	2400.0	95	100	–5.966	.427
GAF	2200.0	90	100	–6.077	.441
Age	2600.0	101	110	–6.670	.459
Schooling (Years)	2500.0	100	100	–6.108	.432

Note: Effect size *r* was calculated as $r = |z| / \sqrt{(n_1 + n_2)}$. All comparisons used the Mann–Whitney *U* test due to non-normal data distributions and unequal group sizes. Negative *z* values reflect rank order differences favoring the comparison group.

Table 2
Exploratory factor analysis of the 29 items validation in the Brief Psychiatric Rating Scale - Children & Adolescents' version

Item	Factor 1 (Externalized)	Factor 2 (Internalized)	Factor 3 (Neurodevelopmental)	Factor 4 (Psychosis)
1	.820	—	—	—
2	.721	—	—	—
3	.538	—	—	—
4	.507	—	—	—
5	.357	—	—	—
6	—	.690	—	—
7	—	.713	—	—
8	—	.411	—	—
9	—	.536*	—	—
10	—	—	—	—
11	—	—	—	.328
12	—	—	—	.595
13	—	—	—	.583
14	—	—	.826	—
15	—	—	.805	—
16	—	—	.406	—
17	—	—	—	—
18	—	—	—	—
19	—	—	—	.357
20	—	.526	—	—
21	—	.559	—	—
22	—	.493	—	—
23	—	—	—	—
24	—	—	—	—
25	—	—	—	—
26	—	—	—	—
27	.281	—	—	—
28	—	—	—	—
29	.491	—	—	—
Eigenvalues	3.65	2.98	2.46	1.89

Note: Exploratory factor analysis (principal axis factoring with oblimin rotation) was conducted on the 29 items in the Brief Psychiatric Rating Scale for Children and Adolescents (BPRS-CA-29). *M* = represents median values, while only factor loadings ≥ .30 are displayed. Dashes (—) indicate loadings below the inclusion threshold. Eigenvalues are reported below, accounting for approximately 60% of the total variance.

* Item 9 demonstrated a marginal cross-loading but was retained due to its clinical interpretability within the internalized factor.

Post hoc factor analysis

The post-hoc factor analysis revealed significant differences in the influence of the internalized dimension between the (non-SRO) and (attempt-SRO) groups. The neurodevelopmental dimension also showed significant differences between non-SRO and both ideation/attempt-SRO. Detailed results are given in Table 3.

Table 3
Post hoc comparisons of factor scores across suicide-related outcomes by sex

Factor	Comparison	*U*	n_1	n_2	*z*	*r*
Internalized	Absent vs Ideation	1300.0	101	11	7.279	.688
Internalized	Absent vs Attempt	1250.0	101	11	6.790	.642
Neurodevelopmental	Absent vs Ideation	1200.0	101	11	6.301	.595
Neurodevelopmental	Absent vs Attempt	1100.0	101	11	5.323	.503
Psychotic	Absent vs Attempt	1400.0	101	11	8.256	.780

Note: Nonparametric Mann–Whitney U tests were used to compare dimensional factor scores between Suicide-Related Outcomes (SROs) categories. Effect size r was calculated using $r = |z| / \sqrt{(n_1 + n_2)}$. Moderate to large effects were observed for internalized, neurodevelopmental, and psychotic factors.

Factor score analysis by sex

Females in the (ideation)-SRO groups scored significantly higher than males in both the internalized and neurodevelopmental dimensions, while those in the (attempt-SROs) group also scored higher for the psychosis dimension. These results are given in Table 4.

Relationship between SROs and BPRS-CA-29 by sex

There was a significant difference in total BPRS-CA-29 scores between groups ($U = 2765.5$, $z = –3.17$, $p = .002$, $r = .22$). Females had significantly higher scores than males in the internalized dimension in the regression analysis when all the SROs in the ninth item of the BPRS-CA-29 were considered. The distribution of the previous results is shown in Figure 1.

DISCUSSION AND CONCLUSION

The main finding of the present study was the sex-based differences with respect to SROs. Males had more (ideation/attempt)-SROs than females. Neurodevelopmental and psychotic psychopathological dimensions were prevalent in both groups. Participants with (ideation/attempt)-SROs had higher total BPRS-CA-29 scores, suggesting a higher patient symptom burden. Females in the non-SROs were also older than their male counterparts. Males with (ideation)-SROs scored higher than females. SROs, associated with the ninth item of the BPRS-CA-29, loaded into the internalized psychopathological dimension. The post-hoc analysis showed that internalized dimension traits can

Table 4
Factor score analysis by suicide-related outcomes categories stratified by sex

Dimension	*SROs*	*M ± SD*	*Female M ± SD*	*Male M ± SD*	*U*	*p*
Externalized	Absent	4.14 ± 3.57	4.12 ± 3.50	4.16 ± 3.58	502.5	.451
	Ideation	4.39 ± 3.75	4.35 ± 3.70	4.42 ± 3.80	510.0	.390
	Attempt	4.30 ± 3.32	4.25 ± 3.30	4.35 ± 3.34	495.5	.504
Internalized	Absent	2.34 ± 2.16	2.32 ± 2.14	2.36 ± 2.18	505.0	.420
	Ideation	4.05 ± 3.11	4.01 ± 3.08	4.10 ± 3.14*	450.0	.020*
	Attempt	4.63 ± 3.02	4.60 ± 3.00	4.65 ± 3.04	470.0	.120
Neurodevelopmental	Absent	3.45 ± 2.33	3.43 ± 2.30	3.47 ± 2.36	498.0	.480
	Ideation	4.62 ± 3.18	4.60 ± 3.15	4.65 ± 3.21*	430.5	.010*
	Attempt	5.00 ± 3.45	4.95 ± 3.40	5.05 ± 3.50	488.0	.330
Psychotic	Absent	1.92 ± 2.01	1.90 ± 2.00	1.94 ± 2.02	499.0	.470
	Ideation	2.07 ± 2.18	2.05 ± 2.15	2.09 ± 2.20	492.0	.520
	Attempt	2.15 ± 2.25	2.12 ± 2.22	2.18 ± 2.27*	435.0	.030*

Note: Mean scores and standard deviations (*M* ± *SD*) are presented for each latent psychopathological factor derived from the BPRS-CA-29, stratified by Suicide-Related Outcomes (*SROs*) category (Absent, Ideation, Attempt) and sex. Mann–Whitney U tests were used to compare male and female scores within each SROs category.
* denote statistically significant differences ($p < .05$) with higher female scores.

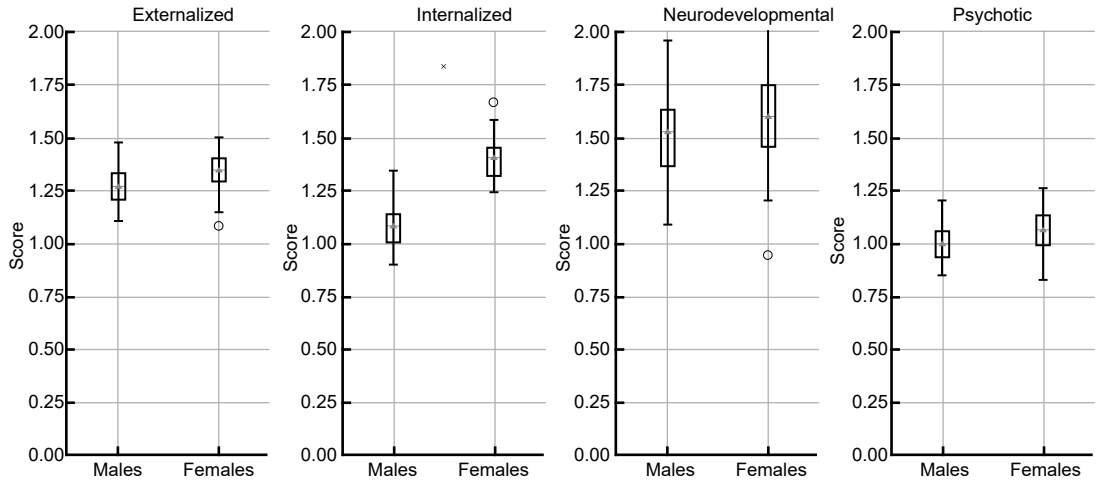

Figure 1. Comparison of Item 9 of the score predictions between each Brief Psychiatric Rating Scale – Children & Adolescents' factor version by sex.

Note: The figure illustrates the mean scores and variability for item 9, categorized by sex and BPRS-CA-29 factors. The boxes represent the interquartile range, the line within the boxes denotes the median, and the red triangles indicate the mean. Whiskers represent the minimum and maximum values, excluding outliers, which are shown as individual points. A significant difference is noted in the internalized factor ($p < .05$), as evaluated by the Mann-Whitney U test.

discriminate between non-SROs and (ideation)-SROs in both sexes. The neurodevelopmental psychopathological dimension differed between the non-SRO group and the ideation/attempt-SROs group. Regression analysis indicated that females scored higher than males on SROs in the internalized psychopathological dimension.

The sample of females in the present study had prevalent internalized dimensional psychopathology in keeping with previous research (Altemus et al., 2014), whereas males presented with behaviors related to externalizing psychopathological dimensions that heightened the risk of SROs (Miranda-Mendizabal et al., 2019). It can therefore be argued that males who present with neurodevelopmental dimensional psychopathology may be less associated with SROs. This also points to the need for methodological frameworks for not only discriminating between but also stratifying the risk of SROs in Mexican adolescents.

The results suggest that internalized, neurodevelopmental, and psychotic psychopathological dimensions and their traits may could play a role in either modulating or influencing (ideation-attempt)-SROs in Mexican adolescent females. For this reason, sex-based research methodologies

in this sample have been explored in previous research (Wasserman et al., 2021). For example, previous findings have shown that adolescents' psychopathology is associated with adverse outcomes in both clinical severity and overall functioning (Davies et al., 2018)The present study is in line with this evidence, since the findings of the research group demonstrated that, regardless of sex differences, adolescents with (ideation/attempt)-SROs had higher psychopathology in comparison to those with (non)-SROs. Clinical severity and global functioning scores showed no significant differences between SRO categories. The previous non-significant association could plausibly be due to the stratification of the sample, which may have affected the statistical scope of the findings. Nonetheless, the results of the study suggest that understudied biopsychosocial determinants may directly or indirectly influence clinical severity and overall functioning, as noted in previous research (Wasserman et al., 2021). Further studies in this line of research are warranted to either reproduce or contrast the findings of the current study in Mexican adolescents.

The analysis identified four distinct psychopathological factors: externalized, internalized, neurodevelopmental, and psychosis, with neurodevelopmental and internalized factors being associated with SROs. Specifically, other research has shown that neurodevelopmental deficits, such as social withdrawal and cognitive impairment, may be strongly related to SROs (Nestor & Sutherland, 2022). These findings underline the importance of implementing interventions in these populations. Moreover, internalized symptoms were significantly more pronounced in females, confirming the established connection between these symptom domains and suicidal behavior.

On the other hand, the lack of significant associations between externalized and psychosis factors suggests they may play an ancillary role in the risk of developing SROs within this sample. This observation contrasts with previous studies of other populations that have associated externalized behaviors, such as aggression, with impulsive suicide attempts, indicating potential cultural or contextual differences (Brokke & Lando, 2022). Future research should therefore explore whether externalized and psychotic symptoms are more pronounced in specific subgroups, such as individuals with comorbidities or those experiencing unique environmental stressors.

Comparisons revealed significant differences between the categories of SROs with respect to internalized and neurodevelopmental factors. Interestingly, although (attempt)-SROs were linked to the internalized factor, a strong association was found between (ideation/attempt)-SROs and the neurodevelopmental factor. This suggests that (ideation/attempt)-SROs may also be related to neurodevelopmental deficits, indicating that categories of SROs could serve as potential transdiagnostic risk markers associated with psychopathology (Gagliano et al., 2024). However, the lack of significant findings concerning externalized and psychotic factors may suggest that these domains are less predictive of SROs in adolescents receiving psychiatric care (Smucny et al., 2024).

Sex-stratified analyses of factor scores highlighted the fact that internalized and neurodevelopmental factors play a key role in females with respect to the occurrence of SROs. These findings suggest that internalized and neurodevelopmental manifestations influence females, potentially increasing their risk of (ideation)-SROs. Although internalized manifestations have been linked to SROs, neurodevelopmental deficits have become increasingly associated with (ideation/attempt)-SROs in adolescent clinical populations (Lévy-Bencheton et al., 2024). The mechanisms involved in the manifestations of SROs point to an interplay between emotional dysregulation, adverse childhood experiences, and depression (Gagliano et al., 2024). These results support the development of tailored interventions addressing sex-specific pathways to SROs. In our study, (Attempt)-SROs were linked to psychotic features, which has been associated with a tenfold higher risk of any SRO (Kelleher et al., 2013). Further exploration is required of how environmental factors, such as family dynamics and peer relationships, may modulate the expression of psychopathology and SROs (Alvarez-Subiela et al., 2022).

The regression analysis indicated that females with internalized symptoms scored higher than males on SROs. This finding aligns with the increased prevalence of internalized symptoms among adolescent females (Nowotny et al., 2015). Females experiencing (ideation/attempts)-SROs are more likely to report distress and seek help. Conversely, males appear to exhibit suicidal ideation or attempts through externalized behaviors (Ibrahim et al., 2017). These differences highlight the importance of sex-sensitive clinical assessments to identify and address the specific risk factors associated with SROs by sex.

This cross-sectional design of the study reduces the possibility of drawing causal conclusions about the association between psychopathological factors and SRO categories. Longitudinal studies are therefore required to explore temporal dynamics and potential causal pathways that could increase the risk of developing SROs. Moreover, reliance on convenience sampling may introduce selection bias, as the sample consists mainly of adolescents receiving clinical psychiatric care, thereby reducing the generalizability of the findings to larger or naturalistic populations. Moreover, nonparametric statistical methods were used due to the non-normality of the data within stratified groups. Finally, unmeasured variables, such as socioeconomic status and other psychosocial characteristics, may have affected the results and should be considered in future research

This study has several strengths. Utilizing a culturally adapted BPRS-CA-29 enhances the relevance of the

findings in the context of Mexican adolescents, addressing the gap in tools designed for this population. The factorial approach of this research enhances our understanding of SROs, highlighting psychopathological categories often overlooked in conventional categorical studies. Additionally, the inclusion of sex-stratified analyses provides valuable data on sex-specific risk factors, which can support the development of tailored prevention and treatment strategies. Moreover, the robust statistical methodology employed, including exploratory factor analysis and post hoc testing with corrections for multiple comparisons, enhances the reliability and validity of the findings.

In conclusion, Mexican adolescents with SROs display high psychopathology. Males have more prevalent (ideation/attempts)-SROs than females and SROs are linked to the internalized psychopathological dimension. Regression analysis showed that females with (ideation-attempts)-SROs scored higher than males in the same psychopathological dimension. The post hoc analysis showed that the characteristics of the internalized psychopathological dimension influence outcomes between (non-SROs) and (ideation-SROs). The psychopathological neurodevelopmental dimension was associated with outcomes between (non)-SROs and (ideation/attempt)-SROs. This suggests that psychopathological dimensions, regardless of sex, may characterize SROs among Mexican adolescents.

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Conflicts of interest

The authors have no conflicts to disclose.

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