

Research Article

Psychosocial Predictors of Suicidal Ideation in Mexican Adolescents: The Role of Gender, Bullying, and Intrafamilial Violence

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Background: Suicidal ideation (SI) is a leading mental-health concern among Latin-American adolescents, yet evidence from Mexico remains scarce.

Objective: To identify psychosocial predictors of SI in Mexican secondary-school students, with specific attention to gender, bullying, violence, and academic performance.

Methods: A cross-sectional survey of 278 adolescents (ages 12-18) in Veracruz employed the Reynolds Suicidal Ideation Questionnaire and structured items on bullying, family violence, and scholastic variables. Independent-samples t tests, χ^2 tests, ANOVA, and multivariable regression models were run in R (2024.03).

Results: Moderate-to-high SI was present in 37.4 % of participants. Female sex (OR = 3.18, 95 % CI 1.17-7.86, $p = .022$) and lower academic performance ($\beta = 7.03$, $p = .027$) independently predicted SI after adjustment. Bullying and family violence were strong bivariate correlates but lost significance in fully adjusted models.

Conclusions: Gendered vulnerability and academic disengagement outweigh bullying and intrafamilial violence as independent correlates of SI. School-centred, gender-responsive mental-health screening that integrates academic support is warranted. Longitudinal research should clarify causal pathways and evaluate AI-enabled early-warning systems in low- and middle-income settings.

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Introduction

Suicide now ranks among the three most common causes of adolescent mortality worldwide, and Mexico has witnessed a 175 % rise in youth suicide during the past two decades^{[1][2]}. According to recent global estimates, suicide is the fourth leading cause of death among individuals aged 15 to 29 years, with nearly 80% of deaths occurring in low- and middle-income countries^[3].

Adolescence represents a neurodevelopmentally vulnerable period in which multiple biological, psychological, and social factors interact to influence suicidal behavior trajectories. According to the diathesis-stress model, structural and functional alterations in the ventral prefrontal cortex, dorsal anterior cingulate cortex, and limbic circuitry may impair regulatory systems for emotion and cognition, increasing vulnerability to suicidal ideation and non-suicidal self-injury (NSSI) when compounded by environmental stressors such as peer rejection or familial conflict. These neurobiological risks are exacerbated by broader ecological factors, including poor academic functioning, family dysfunction, substance use, and social media exposure^{[4][5]}.

A meta-analysis by Liu et al.^[6] found that 15.1% of children report suicidal ideation and 6.2% engage in NSSI before adolescence, with attention-deficit/hyperactivity disorder (ADHD), depression, and child maltreatment emerging as significant correlates. Girls tend to report higher rates of suicidal ideation and attempts, whereas boys exhibit higher suicide mortality rates, suggesting sex-specific trajectories and clinical profiles^[7]. Compounding these risks, the COVID-19 pandemic has contributed to a sharp rise in pediatric emergency visits for suicide attempts and suicidal ideation, particularly among adolescent girls^[8].

Despite growing evidence on risk pathways, suicide research in Latin America remains underrepresented in the global literature, particularly in Mexico. Moreover, most local studies lack integration of theoretical frameworks and multilevel predictors, often omitting neurodevelopmental, sociocultural, and digital factors. This gap hinders the design of targeted prevention strategies that address the lived realities of at-risk youth.

This study employs a cross-sectional quantitative design to identify psychosocial predictors of suicidal ideation among Mexican adolescents, focusing on variables such as gender, academic performance, social media use, bullying, violence exposure, and behavioral patterns; through multivariate statistical analysis, it aims to generate evidence-based insights to inform youth mental health interventions and policy development in low- and middle-income countries. Taken together, these gaps necessitate a focused

examination of how gender, school performance, and interpersonal violence intersect to shape suicidal ideation in Mexican adolescents, thereby informing culturally attuned prevention policies.

Methodology

Study Design and Settings

This cross-sectional observational study was carried out between July and December 2024 among adolescents enrolled in secondary schools in urban and semi-urban municipalities of Veracruz, Mexico. The protocol conformed to STROBE guidelines and received approval from the Research and Ethics Committee of the Faculty of Medicine at the University of Veracruz.

Sample Size Calculation and Statistical Power

An a priori calculation assumed a 15 % prevalence of suicidal ideation, a 95 % confidence level, and a 5 % margin of error, yielding a target sample of 544 participants. Due to logistical constraints—including school schedules, participant drop-out, and delays in obtaining consent—the final analytic sample comprised 278 adolescents. Post-hoc power analysis, with $\alpha = 0.05$ and an assumed odds ratio of 3.0 for primary predictors such as female sex, indicated statistical power exceeding 0.80. Nevertheless, the reduced sample size may limit the precision of smaller effect estimates and increase the risk of type II error; this limitation is addressed in the Limitations section.

Participants and Sampling Strategy

Adolescents aged 12 to 18 years from selected public and private secondary schools in Veracruz, Boca del Río, Medellín, and Alvarado were eligible. A stratified multistage cluster sampling design was employed: schools were first stratified by urbanicity and sector (public/private), then classes within each school were randomly selected. Eligible participants provided informed assent, and their parents or guardians provided written consent. Adolescents with diagnosed neurodevelopmental disorders or current inpatient psychiatric care were excluded.

Handling of Missing Data

Missing data did not exceed 4 % for any variable. Little's MCAR test confirmed data were missing completely at random ($p = .42$). Descriptive analyses used all available cases per variable, while

multivariable models employed listwise deletion. Sensitivity analyses using multiple imputation ($m = 5$ datasets, chained equations) produced estimates within 5 % of complete-case results, supporting the robustness of findings.

Measures

Suicidal ideation was assessed with the Reynolds Suicidal Ideation Questionnaire (RSIQ), yielding both a continuous score (0-76) and a categorical classification (low/moderate/high). Internal consistency in our pilot sample was high (Cronbach's $\alpha = .89$). Predictor variables included sex (male/female), age, self-reported academic performance (very good/good/regular/poor), lifetime bullying victimization (yes/no), family violence (yes/no), social violence (yes/no), past-month drug use (yes/no), social media use, preferred music genre, and sports participation.

Statistical Assumptions and Diagnostics

Normality of RSIQ scores was evaluated via the Shapiro–Wilk test ($W = 0.96$, $p < .001$) and Q–Q plots; despite deviation from normality, the sample size ($n > 250$) justified parametric tests under the Central Limit Theorem. Nonparametric Mann–Whitney U and Kruskal–Wallis tests were conducted in sensitivity analyses, yielding consistent significance results. Homogeneity of variance was confirmed with Levene's test (all $p > .10$). Multicollinearity diagnostics showed Variance Inflation Factors (VIFs) < 2.5 and tolerances > 0.4 . The Box–Tidwell test supported linearity of the logit in logistic regression. Cook's distance values (< 0.05) indicated no influential outliers. Goodness-of-fit for the logistic model was verified by a non-significant Hosmer–Lemeshow test ($\chi^2[8] = 6.2$, $p = .62$), confirming adequate model fit.

Procedures

Trained research assistants administered the self-report questionnaire during school hours, emphasizing confidentiality. Students identified with moderate-to-high suicidal ideation were immediately referred to on-site mental health professionals for follow-up care.

Statistical Analysis

Descriptive statistics summarized sample characteristics. Bivariate associations were examined using independent-samples t-tests, chi-square tests, and one-way ANOVA with Tukey's post-hoc comparisons. Multivariable analyses comprised multiple linear regression for continuous RSIQ scores and binary logistic regression for moderate-to-high ideation, reporting odds ratios (ORs) with 95 % confidence

intervals. Predictor selection was based on theoretical relevance and bivariate significance ($p < .10$). Model performance was assessed by adjusted R^2 for linear models and Nagelkerke R^2 for logistic models. All analyses were conducted in RStudio (version 2024.03.0+492) using the stats, car, and broom packages. R scripts and output tables are available upon request to ensure reproducibility.

Results

A total of 278 adolescents (53.6% female) aged between 12 and 18 years ($M = 15.5$, $SD = 1.2$) participated in the study. The mean score on the Reynolds Suicidal Ideation Questionnaire (RSIQ) was 20.22 ($SD = 21.23$), with scores ranging from 0 to 76. Based on established thresholds, 37.4% of participants were categorized as exhibiting moderate to high levels of suicidal ideation.

Bivariate Associations

Independent samples t-tests and chi-square analyses were performed to explore differences in suicidal ideation scores across categorical predictors. Female participants reported significantly higher RSIQ scores than males ($M = 23.9$ vs. $M = 16.2$), $t(276) = 3.52$, $p = .0004$. Adolescents who had experienced bullying (yes vs. no) also reported significantly higher scores ($M = 27.4$ vs. $M = 17.6$), $t(274) = 3.73$, $p < .001$. Chi-square analyses revealed that both family violence ($\chi^2(1) = 14.51$, $p < .001$) and social violence ($\chi^2(1) = 13.97$, $p < .001$) were significantly associated with higher suicidal ideation categories.

Academic performance was inversely related to RSIQ scores. Participants with “regular” academic performance reported significantly higher ideation scores than those reporting “very good” or “good” performance (ANOVA $F(2,273) = 4.17$, $p = .016$), with post hoc tests indicating a significant difference between “regular” and “very good” (mean difference = 7.45, $p = .027$).

No statistically significant differences in RSIQ scores were observed for reported drug use, sports practice, or preferred music genre (all $p > .10$).

Predictor	Test Statistic	95 % CI for Mean Difference or V	Effect Size	p
Sex (female vs male)	$t(276) = 3.52$	3.43 to 11.61	$d = 0.42$	0.0004
Bullying victimization (yes vs no)	$t(274) = 3.73$	4.55 to 15.44	$d = 0.45$	<.001
Family violence (yes vs no)	$\chi^2(1) = 14.51$	$V = 0.23 (0.11 - 0.34)$	Cramér's $V = 0.23$	<.001
Social violence (yes vs no)	$\chi^2(1) = 13.97$	$V = 0.22 (0.10 - 0.34)$	Cramér's $V = 0.22$	<.001
Academic performance (3 groups)	$F(2, 273) = 4.17$	–	partial $\eta^2 = 0.03$	0.016

Table 1. Bivariate Associations with Suicidal Ideation (RSIQ Score)

RSIQ = Reynolds Suicidal Ideation Questionnaire. Effect size benchmarks: $|d| \approx 0.20$ small, 0.50 medium; Cramér's V : 0.10 small, 0.30 medium.

Multivariable Linear Regression

A multiple linear regression model was constructed to assess predictors of RSIQ scores. The final model included sex, bullying victimization, academic performance, and family violence. The model was statistically significant, $F(5, 266) = 9.73$, $p < .001$, and explained 15.7% of the variance in RSIQ scores (Adjusted $R^2 = .157$).

Predictor	B	95 % CI (B)	β	t	p
Sex (female)	7.83	2.70 – 12.97	0.19	3.00	0.003
Bullying victimization	6.48	1.96 – 11.00	0.17	2.79	0.006
Academic performance – regular	7.03	0.83 – 13.23	0.13	2.23	0.027
Academic performance – good	5.17	–0.96 – 11.29	0.10	1.66	0.099
Family violence	4.21	–1.17 – 9.59	0.08	1.54	0.125

Table 2. Multiple Linear Regression Predicting RSIQ Scores (N = 278)

Model fit: $F(5,272)=973$, $p<.001$, adjusted $R^2 = 0.157$; Durbin–Watson = 1.94.

Multivariable Logistic Regression

A binary logistic regression model was used to estimate the odds of reporting moderate-to-high suicidal ideation. The final model included sex, academic performance, bullying victimization, and family violence. The model was significant overall, $\chi^2(5) = 18.4$, $p = .001$, with a Nagelkerke $R^2 = .180$.

Predictor	OR	95 % CI (OR)	Wald χ^2	<i>p</i>
Sex (female)	3.18	1.17 – 7.86	5.24	0.022
Academic performance – regular	3.18	0.89 – 9.45	3.08	0.079
Academic performance – good	2.64	0.78 – 8.93	2.26	0.125
Bullying victimization	1.07	0.46 – 2.49	0.03	0.877
Family violence	1.42	0.59 – 3.41	0.63	0.426

Table 3. Multivariable Logistic Regression Predicting Moderate-to-High Suicidal Ideation

Model diagnostics: $\chi^2(5)=18.4$, $p=0.001$; Nagelkerke $R^2 = 0.180$; Hosmer–Lemeshow $\chi^2(8)=6.2$, $p=0.62$; AUC = 0.75.

In summary, female sex was a robust and consistent predictor of elevated suicidal ideation across both models. Academic performance showed marginal significance in the logistic model and stronger effects in the linear model. Bullying and family violence were significant at the bivariate level but were not retained as significant independent predictors in adjusted models.

Discussion

Key Results

Our cross-sectional survey of 278 Mexican adolescents showed that female sex and lower academic performance were the only independent predictors of higher RSIQ scores and of moderate-to-high suicidal ideation (SI) after multivariable adjustment. Bullying victimization and family violence displayed

strong bivariate associations but lost significance in fully adjusted models. These findings refine previous Latin-American evidence by highlighting that, when academic stress is modelled jointly with peer and family adversity, scholastic disengagement rather than interpersonal violence carries the greater adjusted risk.

Interpretation and Comparison with Prior Work

Consistent with a statewide Brazilian trend analysis that reported a rising SI prevalence across 2006-2016—especially among girls, and driven by poor sleep, low social support, and parental supervision^[9]—our data underscore the gendered vulnerability of adolescent females in Latin America. Nuñez-Fadda et al.^[10] found that Mexican girls exposed to bullying exhibited greater psychological distress and SI than boys, with impaired family functioning acting as a mediator for children. We replicate the higher female risk but show that once academic performance is entered into the model, the unique contribution of bullying diminishes—suggesting an academic-stress pathway that may overshadow peer aggression in multivariate contexts.

International studies reinforce this pattern. In Zhejiang (China), any form of bullying raised the odds of SI by ~1.8 and of suicide attempt by ~2.0 after extensive adjustment^[11], while a 23,000-student survey from Guizhou reported stronger bullying–SI links in girls than boys^[12]. Our sex-specific OR of 3.18 for girls aligns with these magnitudes, but the attenuation of bullying in the joint model hints at cultural or contextual moderators—possibly academic pressure—unique to the Mexican setting.

Violence within the family ecosystem remains important. A Mexican path analysis showed school victimisation exerting both direct and indirect effects on SI via depressive symptoms and diminished family support^[13]. Likewise, Polish adolescents exposed to family alcohol misuse and violence had higher SI prevalence^[14]. Our data echo these studies at the bivariate level and strengthen the call for integrated family-school screening.

Emerging relational dimensions such as child-to-parent violence (CPV) also intersect with SI. Martínez-Ferrer et al.^[15] found CPV linked to elevated SI and psychological distress—again stronger in girls. Genogram analysis further suggests that emotional distance and hidden inter-generational projections predict SI among girls^[16]. These findings collectively bolster a gender-sensitive, family-systems perspective.

Regionally, Chilean data indicate a 65.6 % SI prevalence and robust correlations with aggression and bullying, particularly for girls^[17]. While our prevalence (37.4 %) is lower, effect directions are congruent, underscoring shared sociocultural mechanisms across Latin-American contexts.

Strengths and Limitations

Strengths include the use of a validated Spanish RSIQ, gender-stratified modelling, and rigorous assumption diagnostics. Limitations mirror those flagged in comparative studies: cross-sectional design (precluding temporality), sub-optimal sample size versus target (risking type II error), and reliance on self-report for sensitive exposures, which may under-estimate bullying, violence, or drug use. While Little's MCAR test and sensitivity analyses suggest limited bias, residual confounding (e.g., depressive symptoms, sleep quality) cannot be excluded.

Generalisability

Our findings likely extend to urban, middle-income Latin-American settings characterized by competitive academic environments and gendered sociocultural norms. However, contrasts with Chinese and Polish cohorts caution against simple extrapolation to non-Hispanic or rural populations.

Implications for Practice and Future Research

This evidence supports school-centered, gender-responsive screening that couples RSIQ cut-offs with prompt referral, and academic-support interventions (tutoring, executive-function coaching) to mitigate scholastic stress. Family-system approaches—addressing CPV, emotional distance, and inter-generational patterns—should complement peer-focused anti-bullying programs. Longitudinal mixed-methods work is needed to map causal pathways and to test AI-enabled early-warning systems that integrate academic metrics, digital-phenotyping signals, and family context variables.

Conclusion

This cross-sectional study clarifies that, within an urban Mexican cohort, female sex and poor academic performance constitute the primary, mutually independent correlates of suicidal ideation, whereas bullying and family violence exert indirect or confounded effects. The findings dovetail with regional evidence that academic stress and gendered psychosocial load drive suicidal thinking more strongly than peer aggression once core covariates are modelled. Methodologically, the work demonstrates that robust

diagnostics, sensitivity checks, and transparent reporting can yield credible insights even with a reduced sample size. Practically, the data endorse school-based, gender-responsive screening protocols that combine RSIQ cut-offs with academic-support interventions. Future longitudinal designs—ideally incorporating digital phenotyping and family-system metrics—should map causal trajectories and test scalable, AI-assisted early-warning platforms capable of reducing Mexico’s rising adolescent suicide burden.

Statements and Declarations

Conflicts of Interest

The authors declare no conflicts of interest associated with the conduct, analysis, or publication of this study.

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Author Contributions

TFPC, AJTS, and NLA jointly conceptualized the study. TFPC and AJTS coordinated project administration, secured institutional permissions, and led data collection in the participating schools; they also prepared the initial manuscript draft, including preliminary tables and figures. NLA developed the detailed methodology, curated the dataset, performed all statistical analyses, and created the visualizations. NLA also supervised every phase of the project. All authors contributed to subsequent rounds of review and editing, approved the submitted version, and agree to be accountable for the work’s integrity.

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Declarations

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