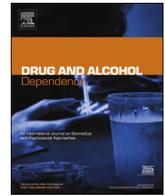




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Short communication

Risk and protective factors for heroin use in a nationally representative sample of Ecuadorian youth

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ABSTRACT

Introduction: Recent reports from a variety of sources indicate that heroin use among Ecuadorian adolescents is on the rise. In order to design effective prevention and intervention programs, research is needed that quantifies use and assesses risk and protective factors associated with use.

Methods: This study analyzed the National Survey of Drug Use, a nationally representative survey of 50,145 adolescents (49.6% female; *M* age = 14.92 years, *SD* = 1.74) conducted in Ecuador in 2015.

Results: Overall, 2.3% of the sample reported lifetime heroin use. Logistic regression analysis revealed that higher lifetime heroin use was associated with lifetime use of alcohol (Adj OR = .71 CI[.58, .86]), marijuana (Adj OR = 3.79 CI[3.17, 4.52]), and hard drugs (Adj OR = 16.33 CI[13.89, 19.21]), as well as with greater perceived access to heroin (Adj OR = 2.13 CI[1.93, 2.36]) and repeating more school grades (Adj OR = 1.66 CI [1.37, 2.01]). Higher levels of parental involvement (Adj OR = .95 CI[.91, .99]) were associated with a reduced risk of use. Risk and protective factors operated similarly across age and gender.

Conclusion: These data suggest that targeting substance use early in adolescence, focusing on school engagement, enhancing parenting skills, and improving family climate may be important approaches to curbing heroin use among Ecuadorian teens. The relative absence of age and gender differences in patterns of risk and protection suggest that a universal prevention approach versus a targeted approach may be most effective.

1. Introduction

During the past decade, national studies in Ecuador indicate that heroin use among adolescents is on the rise (Observatorio Nacional de Drogas, 2009, 2012a,b). First appearing in national surveys in 2009, adolescent prevalence rates of heroin use vary by region, with higher rates in areas with high volumes of drug trafficking, such as port cities (Observatorio Nacional de Drogas, 2012a,b). National surveys in Ecuador reveal early ages of initiation – between 13 and 14 years old – for both legal and illicit substances (Observatorio Nacional de Drogas, 2008). This is concerning for health care providers, educators, and others who work with adolescents, given the negative impacts of substance use initiation and escalation on physical and mental health (see Volkow et al., 2014) and academic engagement and performance (see Patte et al., 2017). The rise in heroin use among Ecuadorian youth mirrors worldwide increases in opioid use (United Nations Office on Drugs and Crime [UNODC], 2017). Opioid use is particularly concerning because it is associated with risk of acquiring infectious diseases through unsafe injecting practices, and risk of overdoses (UNODC,

2017). In order to address the rising heroin use among Ecuadorian teens, and to design evidence-based prevention and intervention programs, research that characterizes heroin use and assesses risk and protective factors associated with use is needed. The current study used the national survey on drug use conducted in 2015 (Observatorio Nacional de Drogas, 2015) to begin to address these questions.

National surveys previously conducted in Ecuador revealed positive associations between age and lifetime of use of alcohol, marijuana, and hard drugs, such as cocaine (Observatorio Nacional de Drogas, 2008, 2009, 2012a,b). We included assessments of these substances, as well as tobacco, in our models, because we wanted to understand how other substance use was associated with risk for heroin use. Repeating grades in school, an indicator of academic achievement and perhaps academic engagement, was included in our model because of the corpus of evidence linking school failure to risk for substance use (cf. Arthur et al., 2002). Perceived availability of heroin was included as a risk factor because there also is substantial evidence associating perceived availability of drugs with risk for substance use (Arthur et al., 2002). Conversely, parental involvement was included as a protective factor for

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three reasons. First, there are robust associations between positive parenting practices and reduced risk for substance involvement among teens (Kliewer, 2010; Kliewer and Zaharakis, 2014). Second, in the Hispanic culture, youth are socialized to respect their parents, and the family is an important source of support for youth (Kliewer et al., 2015; Santisteban et al., 2002). Third, research in Ecuador has found that family functioning plays an important role in preventing problem behavior, including substance use (Ramirez and de Andrade, 2005; Oviedo et al., 2009).

In summary, the present study evaluated factors associated with level of lifetime heroin use in a nationally representative sample of Ecuadorian youth. Based on previous literature, we anticipated that use of other illicit substances, higher perceived access to heroin, and a history of repeating school grades would be associated with increased risk for heroin use, while higher levels of parental involvement would be associated with reduced risk of heroin use. We also examined interactions of age and gender with risk and protective factors predicting heroin use as exploratory questions.

2. Method

2.1. Participants and study design

Participants included 50,145 Ecuadorian adolescents (49.6% female; $M = 14.92$, $SD = 1.74$; Range = 11–18 years) who completed surveys as part of the national survey of drug use conducted in Ecuador in 2015 (Observatorio Nacional de Drogas, 2015). In 2015 Ecuador had approximately 1,123,178 students eligible to complete the survey.

2.2. Survey procedures

The survey was approved by the Ministries of Health and of Education and was completed anonymously; students consented to allow the information they provided on the surveys to be analyzed and reported. The sampling plan was designed by the National Institute for Census and Statistics in Ecuador and involved two phases. In phase one, a random sample of 224 public and private schools serving youth in grades equivalent to 9th, 11th, and 13th in the United States and who met either in the morning or afternoon were identified from the capital cities, urban areas, and cities with more than 30,000 inhabitants. In phase two, a random sample of grade 9, 11, and 13 classrooms in those schools were identified for assessment. University students, who were not connected to school staff, oversaw the survey administration. They explained questions that were difficult to answer to the entire class before students began completing the survey and were available to answer questions throughout the process. Teachers were not in the classroom while surveys were completed in order to eliminate any sense of coercion. Students completed the survey in one sitting, which took between 20 and 60 min, depending on their level of substance use, during normal school hours. Once completed, students placed their surveys, which had no identifying information, into envelopes with codes assigned for the classroom and school. No compensation was provided to participants for their study involvement.

2.3. Assessment of study constructs

Study constructs were assessed using items and measures that had been validated with Ecuadorian youth and used in previous national surveys.

2.3.1. Substance use

Lifetime use of heroin, tobacco, alcohol, cannabis, and cocaine each were based on single-item questions similar to “Have you ever used _ in your life?” Positive responses were coded (1) and negative responses were coded (0). Lifetime use of heroin use was the outcome variable in the study; lifetime use of tobacco, alcohol, cannabis, and cocaine were

included in the model as covariates.

2.3.2. Risk and protective factors

Risk factors included in the model were number of years grades were repeated and perceived difficulty of access to heroin. The protective factor included in the model was parental involvement. Number of years grades were repeated was derived from a 1-item question, “How many years have you repeated your studies?” Response options were none (0), one (1), or two or more (coded as 2). Perceived difficulty of access to heroin was computed from one item. Non-responders were coded as very low risk (1). The survey response option of “I cannot get it” was coded (2) – low risk; “It’s difficult” was coded (3) – moderate risk; and “It’s easy” was coded (4) – highest risk. Parental involvement was computed from six questions that assessed parental knowledge, interest, control, monitoring, and engagement. These included: (1) When you are out of school or during the weekends, how many times your parents DO NOT know where you are; (2) In general, do your parents know what you watch on TV? (3) How worried are your parents about what you do at school? (4) During the weekends, do your parents control the time you are supposed to go back home? (5) Do you think your parents know your closest friends? and (6) When you go out of your house, before or after school, do your parents expect you to tell them where you are going? Response options varied across items. Items were recoded and summed so that higher scores indicated greater levels of parental involvement.

3. Results

3.1. Descriptive analyses

Table 1 presents results of the descriptive analyses. As seen in Table 1, overall lifetime heroin use in this national sample of Ecuadorian adolescents was low, but higher among males compared to females, Chi square (1) = 82.13, $p < .001$, and higher among older compared with younger youth, Chi square (2) = 22.90, $p < .001$. In these analyses, younger (ages 11–13), middle (ages 14–16) and older (ages 17–18) adolescents were compared. This pattern of gender and age group differences was identical for lifetime tobacco, alcohol, cannabis, and other drug use. Among youth who endorsed lifetime use of cannabis (not shown in Table 1), 12.1% endorsed lifetime use of heroin; this figure was 20.6% for youth who endorsed lifetime use of other drugs.

3.2. Logistic regression analysis predicting lifetime heroin use

Table 2 presents the results of the logistic regression analysis predicting lifetime heroin use. Adolescent age and gender were entered in a block in the first step of the regression. Lifetime use of tobacco, alcohol, cannabis, and other drugs were entered next on step 2. The risk factors of perceived access to heroin and number of grades repeated and the protective factor of parental involvement were entered on step 3. Finally, the interactions of these three risk and protective factors with age and separately with gender were entered on step 4. All non-dichotomous level predictors were centered, and interaction terms were constructed from these centered variables. As seen in Table 2, lifetime use of alcohol, cannabis, and other drugs, but not tobacco, was associated with increased risk of lifetime heroin use. Once substance use predictors were entered in the model, age and gender were no longer significantly associated with increased risk of heroin use. Both greater perceived access to heroin and more repeated grades also were linked to increased risk lifetime heroin use, while higher levels of parental involvement were associated with lower risk of lifetime heroin use. In terms of moderator effects, the only significant effect present was an age X years grades repeated interaction. Probing this interaction revealed that the impact of repeating grades on risk of lifetime heroin use was less pronounced among the oldest youth in the sample, relative to

Table 1
Descriptive Information on Study Variables.

Study Variables	Overall Sample % or M (SD) N = 50,145	Females % or M (SD) n = 24,465	Males % or M (SD) n = 24,877	Younger Adolescents (11 – 13) % or M (SD) n = 13,713	Middle Adolescents (14 – 16) % or M (SD) n = 24,625	Older Adolescents (17 – 18) % or M (SD) n = 11,807
Lifetime heroin use	2.3	1.7	2.9	1.8	2.4	2.6
Lifetime tobacco use	26.6	19.6	33.9	10.6	28.4	41.3
Lifetime alcohol use	50.8	48.6	53.7	25.7	54.4	72.4
Lifetime cannabis use	11.3	7.5	15.4	3.0	12.6	18.3
Lifetime use of other drugs	8.1	6.9	9.4	6.3	8.7	9.1
Years grades were repeated	0.25 (0.53)	0.18 (0.46)	0.31 (0.59)	0.14 ^a (0.43)	0.25 ^b (0.52)	0.39 ^c (0.63)
Access to heroin	1.66 (0.86)	1.63 (0.84)	1.68 (0.87)	1.62 ^a (0.79)	1.67 ^b (0.88)	1.66 ^b (0.89)
Parental involvement	11.19 (2.27)	11.44 (2.21)	10.94 (2.30)	11.53 ^a (2.27)	11.12 ^b (2.25)	10.94 ^c (2.26)

Note. Possible range on years grades were repeated was 0–2; on access to heroin was 1–4; and on parental involvement was 3 – 15. Relative to females, males repeated more grades in school, $t(48,340) = -27.15, p < .001$, reported greater perceived access to heroin, $t(47,567) = -6.42, p < .001$, and indicated their parents were less involved in their lives, $t(48,594) = 24.07, p < .001$. There were significant age group differences for repeating grades, $F(2, 49040) = 691.12, p < .001$, perceived access to heroin, $F(2, 48254) = 12.64, p < .001$, and parental involvement, $F(2, 49299) = 240.75, p < .001$. Different superscripts differed significantly.

young and middle adolescents.

4. Discussion

The rising tide of heroin use among young people in Ecuador necessitates empirically-based approaches to prevention and intervention to stem drug use and reduce the potential for harm associated with use. Results from this nationally representative survey suggest several promising avenues for intervention based on correlates of heroin use. These include (1) targeting alcohol, marijuana, and other substance use, especially among early adolescents; (2) addressing issues of school disengagement and failure, as this often is a turning point for adolescents; (3) enhancing community efforts to reduce access to heroin; and (4) working within family systems to help parents to feel more efficacious, and to strengthen family cohesion and communication. To this point, recently Molledal et al. (2017) evaluated the short-term effects of *Familias Unidas*, a Hispanic/Latino-specific, parent-centered intervention that was adapted and tested for use in Ecuador. Results of this randomized clinical trial at the three-month follow-up indicated that youth in the *Familias Unidas* condition had significantly fewer conduct problems than youth in the community practice condition. Further, analysis of indirect effects indicated that the program operated by improving parent-adolescent communication in the *Familias Unidas* condition, compared to community practice. Molledal et al. (2017) intend to evaluate impacts on substance use in future papers. Molledal et al.

(2017) provide an exemplary example of a family-centered program that was adapted and tested in Latin America. Unfortunately, Mejía et al. (2019) note this is not the norm. Mejía et al. provide recommendations for adapting and rigorously evaluating family interventions in Latin America.

The current study had several strengths, most notably the large, nationally representative sample and focus on a topic with significant public health relevance. Study limitations include over-reliance on one-item indicators to measure key constructs; lack of information regarding family socio-economic status; limited opportunity to assess additional risk and protective factors that have known links to substance use due to their lack of inclusion in the survey (e.g., deviant peer affiliation); lack of inclusion of prescription opioids in the survey battery; the cross-sectional design, which does not allow us to tease out the temporal order of variables, or assess the degree of bi-directional associations; and reliance on a sole reporter. Further, because youth were only surveyed in school, the survey missed students who dropped out and who may be at highest risk for mental health issues as well as heroin use. None-the-less, this study provides empirical support and direction for addressing the growing problem of opioid use among teens in Ecuador.

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Funding for this study was provided by Ecuadorian government

Table 2
Results of Logistic Regression Analysis Predicting Lifetime Heroin Use in Ecuadorian Adolescents (N = 50,145).

Predictor Variables	Model 1		Model 2		Model 3		Model 4	
	Adj OR	95% CI	Adj OR	95% CI	Adj OR	95% CI	Adj OR	95% CI
Age	1.10***	[1.06, 1.14]	.95*	[.91, .99]	.93**	[.89, .97]	.98	[.93, 1.04]
Gender (0 = female, 1 = male)	1.71***	[1.50, 1.94]	1.20*	[1.04, 1.38]	1.11	[.95, 1.28]	1.17	[.97, 1.41]
Lifetime Tobacco Use			1.05	[.88, 1.25]	.99	[.83, 1.19]	.99	[.83, 1.19]
Lifetime Alcohol Use			.78**	[.65, .93]	.72***	[.59, .87]	.71***	[.58, .86]
Lifetime Cannabis Use			4.82***	[4.07, 5.72]	3.78***	[3.16, 4.51]	3.79***	[3.17, 4.52]
Lifetime Other Drug Use			21.59***	[18.47, 25.25]	16.38***	[13.93, 19.26]	16.33***	[13.89, 19.21]
# Yrs Grades Repeated					1.62***	[1.46, 1.80]	1.66***	[1.37, 2.01]
Access to Heroin					1.99***	[1.87, 2.12]	2.13***	[1.93, 2.36]
Parental Involvement					.94***	[.91, .96]	.95*	[.91, .99]
Repeat X Age							.93*	[.88, .99]
Repeat X Gender							1.00	[.80, 1.25]
Access X Age							.97	[.94, 1.01]
Access X Gender							.90	[.79, 1.03]
Involve X Age							1.00	[.99, 1.02]
Involve X Gender							.99	[.93, 1.05]

Note. OR = Odds Ratio. CI = Confidence Interval. * $p < .05$; ** $p < .01$; *** $p < .001$.

through the Secretary of Drug Prevention and Control.

Contributors

Ms. Ocaña-Gordillo and Dr. Kliever jointly designed the study, conducted literature searches, and each wrote portions of the manuscript. Dr. Kliever conducted the statistical analyses and edited the manuscript. Both authors contributed to and approved the final manuscript.

Declaration of Competing Interest

The authors have no conflicts of interest to disclose.

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