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Short report

Understanding the gendered patterns of substance use initiation among adolescents living in rural, central Mexico

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ABSTRACT

Background: Little is known about the age of initiation and gender differences in substance use among adolescents in rural, central Mexico.
Methods: The cross-sectional data were collected from students enrolled in the Videobachillerato (VIBA) (video high school) programme in Guanajuato, Mexico. Questionnaires asked students about the age at which they had used alcohol, cigarettes, or cannabis for the first time. Kaplan–Meier Survival Functions were used to estimate if males and females were significantly different in their cumulative probabilities of initiating substances over time.
Results: On average, alcohol is initiated at 14.7 years of age, cigarettes at 15.1 years of age, and cannabis at 16.5 years of age. Over time, males had a significantly higher probability of initiating alcohol (Kaplan–Meier Failure Curve: $X^2 = 26.35$, $p < 0.001$), cigarettes (Kaplan–Meier Failure Curve: $X^2 = 41.90$, $p < 0.001$), and cannabis (Kaplan-Meier Failure Curve: $X^2 = 38.01$, $p < 0.001$) compared to females.
Conclusions: These results highlight the gendered patterns of substance use initiation among adolescents in rural, central Mexico and underscore the need for gendered substance use prevention interventions with these adolescents. By putting forth efforts to understand substance use initiation patterns of adolescents living in rural, central Mexico, culturally specific and efficacious prevention efforts can be tailor-made to create lasting differences.

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Substance use related diseases and injuries are global issues negatively impacting the health of young people worldwide (Blum & Nelson-Mmari, 2004). Compared to other countries, Mexican youth traditionally report lower rates of substance use (Vega et al., 2002); however, recent epidemiological data suggest that substance use among Mexican youth is rising while age of initiation and gender differences in substance use are decreasing, especially among younger cohorts of adolescents (Degenhardt et al., 2008; Lotrean et al., 2005). For example, in 1991, the prevalence of cannabis use in Mexico showed sizeable gender differences among adolescents between the ages of 15–17: 1.7–2.9% for males and 0.3–0.5% for females (Villatoro et al., 1998). By 2005, however, the prevalence of cannabis use in the same age group nearly tripled, while the gender gap narrowed: 3.7–9.9% for males and 3.5–4.5% for females (Benjet et al., 2007). Given this rise in substance use among Mexican adolescents, especially among females, it is important to study substance use initiation patterns because adolescence is a critical developmental period where youth often choose to start using alcohol, cigarettes and illicit drugs (Chen & Kandel, 1995). This understanding can lead to the creation of effective policies and programmes aimed at curbing the continuing increase of substance use among Mexican adolescents.

There is little research on substance use initiation among Mexican youth. However, one study conducted in the Mexican state of Morelos found that youth who smoked cigarettes and drank alcohol at a younger age were more likely to use other drugs (Wagner, Velasco-Mondragón, Herrera-Vázquez, Borges, & Lazcano-Ponce, 2005). This association was especially strong among males, as early alcohol and tobacco users were three times more likely to use other drugs. Gender differences appear to be more salient among youth in rural communities where individuals tend to adhere to more traditional gender roles, and these social norms permit more substance use among males (Medina-Mora, 1994; Ozer & Fernald, 2008). The traditional gender role of machismo, for males, can emphasize engaging in risk-taking behaviours, thus potentially leading to substance use initiation at earlier ages and over time (Nagoshi, Marsiglia, Parsai, & Castro, 2011). For females, however, marianismo – the traditional notion that women's primary obligation is to

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family, motherhood, and virtuosity (Kulis, Marsiglia, Lingard, Nieri, & Nagoshi, 2008) – may be related to their delay of substance use initiation.

Typically, the research examining substance use initiation in Mexico has been conducted in urban areas and in the northern states (Ozer & Fernald, 2008), little is known about the age of initiation, prevalence, and gender differences in substance use among youth in rural, central Mexico. The state of Guanajuato, located in west central Mexico, is one such rural areas where research on substance use initiation is needed – not only because of the lack of prior research but because more migrants travel to the United States from Guanajuato than almost any other state in Mexico (Massey, Durand, & Malone, 2002). Thus, there are public health implications for individuals living in both Mexico and the United States. The purpose of this article is to investigate substance use initiation among youth in rural, central Mexico. Our aim is to determine if the gender gap is narrowing as indicated in more urban areas of Mexico or if youth in rural Mexico continue to have significant gender differences.

Methods

The cross-sectional data were collected from students enrolled in the Videobachillerato (VIBA) (video high school) programme in Guanajuato, Mexico. This alternative schooling system is a subsystem of the state-sponsored Sistema Avanzado de Bachillerato y Educación Superior (Advanced System of Baccalaureate and Higher Education [SABES]), that operates through an extensive network of centres in the state. SABES is a decentralized and autonomous institution within the state government. VIBA centres were designed to reach students who could not afford or did not live near a traditional high school.

Procedure

When data collection took place (January–June, 2007) there were 252 VIBA centres with more than 25,000 enrolled students. For this study, eight centres were randomly selected. With IRB approval, and receiving training from the Arizona State University research team, school psychologists in each VIBA programme informed the students of the objective of the study, that participation was voluntary and anonymous, and that the data were confidential. Because this was a school-system sponsored activity, only verbal consents were received to allow students to opt out of taking the survey. To consented students, questionnaires were administered. The response rate for this study was 95%.

Participants

A total of 702 students completed the questionnaire. The average participant was female (60%), age 16, and received average grades in school (86% had a GPA representing mostly Bs and Cs). In addition, the majority (70%) reported their fathers had an education equal to or less than an elementary education, with only 3% reporting that their fathers had finished high school. From this total sample, three subsamples, each representing a different substance (alcohol, cigarettes, and cannabis), were created and run individually in order to understand substance use patterns.

Measures

For the three subsamples (alcohol, cigarette, and cannabis use) two measures were created: (1) ever used a specific substance (alcohol, cigarettes, or cannabis); and (2) age of initiation of each specific substance. In creating age of initiation, the current age of adolescents who never used the particular substance was entered as a valid response. The *alcohol initiation* subsample contained 690 adolescents, 78.84% of whom had drank alcohol. The *cigarette initiation* subsample contained 685 adolescents, 56.20% of whom had smoked cigarettes. The *cannabis initiation* subsample contained 693 adolescents, 12.84% of whom had smoked cannabis.

Statistical analysis

Kaplan–Meier Survival Functions were used to estimate the cumulative probability of initiating alcohol, cigarettes, and cannabis at each age. Data are right censored for adolescents who, at their current age, have never used the substance in each subsample. For every age, the probability on initiating alcohol, cigarettes, and cannabis is calculated. These estimates give a conditional probability of surviving substance-free at each age. Using the Log-Rank and Wilcoxon tests, gender differences were assessed in the probabilities of initiating substances over time. All models were analysed using Stata 10 (2009) in order to adjust for clustering at the school level.

Results

On average, adolescents initiated alcohol use at 14.7 years of age (SD = 2.17), cigarette use at 15.1 years of age (SD = 2.24), and cannabis use at 16.5 years of age (SD = 1.464) (data not shown). Table 1 and Fig. 1a present the estimates for alcohol initiation by gender. Females had a significantly higher probability of delaying alcohol initiation at every age. For example, at age 13 the cumulative probability of survival for females was .88 compared to .73 for males. The cumulative probability of survival dropped by age 15 to .43 for females and .28 for males. By age 17 males had a cumulative probability of survival equal to .06, while females equalled .17. Both the Log-Rank test ($X^2 = 26.35$, $p < 0.001$) and the Wilcoxon test ($X^2 = 25.28$, $p < 0.001$) were significant, indicating that there are gendered differences with regards to alcohol initiation.

The estimates for cigarettes initiation by gender are presented in Table 1 and Fig. 1b. Like alcohol initiation, females had a significantly higher probability of delaying cigarette initiation at every age. For example, females had a cumulative probability of survival for cigarette initiation at age 13 of .89, compared to .74 for males. By age 15 64% of females had not initiated cigarette smoking, compared to only 44% of males. The cumulative probability of survival dropped to .44 for females and .23 for males by age 17. Both the Log-Rank test ($X^2 = 41.90$, $p < 0.001$) and the Wilcoxon test ($X^2 = 40.84$, $p < 0.001$) were significant, indicating gendered differences with regards to cigarette initiation.

Table 1 and Fig. 1c presents the estimates for cannabis initiation by gender. Like cigarette and alcohol initiation, females had a significantly higher cumulative probability of surviving at all ages as compared to males. As Fig. 1c shows, the difference between males and females from age 15 until age 22 is dramatic. By age 18, females had a cumulative probability of survival for cannabis initiation of .85, while the cumulative probability among males equalled .61. The cumulative probability of survival dropped to .44 for females and .23 for males by age 17. Both the Log-Rank test ($X^2 = 38.01$, $p < 0.001$) and the Wilcoxon test ($X^2 = 31.35$, $p < 0.001$) were significant, indicating gendered differences with regards to cannabis initiation.

Discussion

This is the first study that we are aware of to examine substance use initiation among Mexican adolescents living in rural

Table 1
Life-table estimates of cumulative probability of survival and Log-Rank and Wilcoxon tests for alcohol, cigarette, and cannabis initiation.

Alcohol initiation		
Age (years)	Cumulative proportion of survival	
	Females	Males
First initiated alcohol use		
13	0.88	0.73
14	0.72	0.61
15	0.43	0.28
16	0.30	0.16
17	0.17	0.06
18	0.09	0.04
Log-Rank Test	26.35***	
Wilcoxon Test	25.28***	

Cigarette initiation		
Age (years)	Cumulative proportion of survival	
	Females	Males
First initiated alcohol use		
13	0.89	0.74
14	0.80	0.62
15	0.64	0.44
16	0.53	0.36
17	0.44	0.23
18	0.33	0.14
Log-Rank Test	41.90***	
Wilcoxon Test	40.84***	

Cannabis initiation		
Age (years)	Cumulative proportion of survival	
	Females	Males
First initiated alcohol use		
13	1.00	0.98
14	1.00	0.97
15	0.98	0.90
16	0.95	0.84
17	0.89	0.72
18	0.85	0.61
Log-Rank Test	38.01***	
Wilcoxon Test	31.35***	

*** $p < 0.001$.

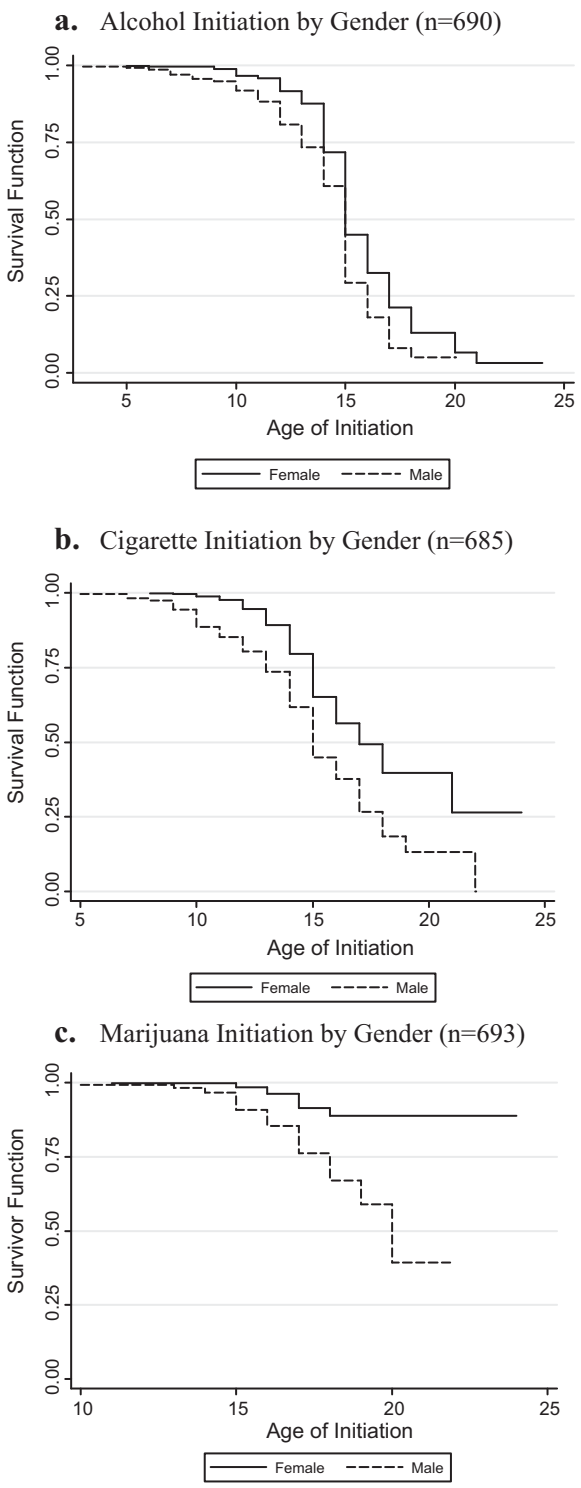

Fig. 1. Kaplan–Meier Survival Estimates.

communities in central Mexico. These findings provide important information about when adolescents in rural, central Mexico begin to initiate alcohol, cigarette, and cannabis use. While alcohol and cigarettes are initiated during preadolescence (ages 9–14), cannabis is initiated at an older age, during adolescence (ages 15–18). Additionally, among adolescents (ages 15–18), the use of alcohol is much heavier than the use of cigarettes. By the age of 18, 77% of adolescents had used alcohol compared to 55% for cigarettes. However, among preadolescents (ages 9–14) the proportion of adolescents using alcohol and cigarettes is almost the same. This finding supports the idea that adolescents have age-related patterns of substance use initiation (Kosterman, Hawkins, Guo, Catalano, & Abbott, 2000), and points to a possible progression from alcohol and cigarettes to cannabis use among adolescents in rural central Mexico.

These findings also indicate that substance use in rural, central Mexico remains a gendered phenomenon. Males are more likely to initiate alcohol, cigarettes, and cannabis at earlier ages and over time. For example, the cumulative proportions of adolescents who had used cannabis were similar to that of other studies (Benjet et al., 2007); however, the gender gap for rural, central Mexican adolescents is still pervasive. Unlike Benjet et al. (2007) who found a narrowing gender gap for cannabis use, our study highlights the ongoing gender gap in cannabis use – by age18. 3% of males had used cannabis compared to only 15% of females. This suggests that strong social and cultural norms are still inherent in rural Mexican culture. The differences found in the substance use initiation of these rural male and female respondents appears to be related to their stronger adherence to the traditional gender role of machismo and marianismo (Nagoshi et al., 2011; Kulis et al., 2008).

Limitations

Several study limitations should be noted. First, the participants in this study were selected from an alternative high school programme in low socioeconomic communities of Guanajuato. Therefore, the results of this study may not be easily comparable to youth attending traditional high schools in more urban communities of Mexico. Also, the data are cross-sectional, thus limiting the conclusions able to drawn from this study. Ideal studies will be longitudinal and will include participants in traditional high schools, alternative high schools, and youth who are not currently attending school. They should also include states from all regions of Mexico, and make sure to gather data from both rural and urban communities. The present study, however, makes a significant contribution to the literature by capturing the experiences of youth that are usually not represented or underrepresented in other substance abuse studies.

Conclusion

The results of this study describe the gendered patterns of substance use initiation among adolescents in rural, central Mexico, and have practical research and policy implications. Researchers can use these findings to conduct additional studies on substance use initiation among Mexican adolescents that will contribute to the creation of culturally specific, age-specific, context-specific, and gender-specific substance use prevention programmes. Policy makers can use these findings to strive to address this growing public health concern by supporting the adoption of substance use community-based prevention efforts and throughout the different educational systems. While international research on gender differences and substance use initiation is scarce, by putting forth efforts to understand substance use initiation patterns of adolescents in specific social contexts, culturally specific prevention efforts can be created and disseminated across contexts so that lasting health benefits can be made in the lives of adolescents in different nations.

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