Sexual behavior among high school students in Brazil: alcohol consumption and legal and illegal drug use associated with unprotected sex

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OBJECTIVE: Alcohol and other drug use appears to reduce decision-making ability and increase the risk of unsafe sex, leading to possible unplanned pregnancies, sexually transmitted diseases/human immunodeficiency virus/HIV transmission, and multiple sexual partners. This study aimed to test the hypothesis that risky sexual behaviors among adolescents are associated with legal and illegal drug use.

METHODS: A national cross-sectional survey of 17,371 high-school students was conducted in 2010. Students were selected from 789 public and private schools in each of the 27 Brazilian state capitals by a multistage probabilistic sampling method and answered a self-report questionnaire. Weighted data were analyzed through basic contingency tables and logistic regressions testing for differences in condom use among adolescents who were sexually active during the past month.

RESULTS: Approximately one third of the high school students had engaged in sexual intercourse in the month prior to the survey, and nearly half of these respondents had not used a condom. While overall sexual intercourse was more prevalent among boys, unsafe sexual intercourse was more prevalent among girls. Furthermore, a lower socioeconomic status was directly associated with non-condom use, while binge drinking and illegal drug use were independently associated with unsafe sexual intercourse.

CONCLUSION: Adolescent alcohol and drug use were associated with unsafe sexual practices. School prevention programs must include drug use and sexuality topics simultaneously because both risk-taking behaviors occur simultaneously.

KEYWORDS: Sexual Risky Behavior; Binge Drinking; Illegal Drug Use; School Survey; Adolescents.

INTRODUCTION

Adolescence is characterized by emotional, social and physical transformations that can expose young people to emotional and health vulnerabilities. In this period of development, young people begin to engage in risky behaviors, such as alcohol/drug use and unsafe sex (1). In Brazil, the onset of alcohol use occurs on average during adolescence, and approximately 35% of high school students tend to engage in binge drinking (defined as drinking five or more doses of alcohol on one occasion). This drinking behavior pattern is often carried out by these teenagers at parties and nightclubs, despite the sale of alcoholic beverages and entry into nightlife environments being prohibited to adolescents younger than 18 years of age in this country (2).

Particularly in the nightlife environment, youth may associate alcohol consumption with sexual practices, believing that alcohol may act as a facilitator for sexual encounters. After drinking, young individuals feel more confident to attempt a sexual approach (3). Moreover, there is a belief that alcohol consumption can help improve sexual performance and increase sexual pleasure (4). However, alcohol and other psychotropic drugs appear to be associated with unsafe sex. English young adults who drank and used illegal drugs had more sexual partners and had engaged in more episodes of unsafe sex compared with the abstainers from alcohol or drugs (5). In Africa, binge drinking episodes were causally associated with unsafe sex and sexual violence among adults (6).

Drug use and unprotected sex among adolescents
Sanchez ZM et al.

CLINICS 2013;68(4):489-494

Alcohol use reduces decision-making ability and decreases the chances of rejection of an unwanted sexual act, leading to possible pregnancy, STD/HIV transmission and multiple sexual partners (7). Some authors have emphasized the ''Alcohol Myopia Theory'' to explain risk behaviors associated with the pharmacological effects of alcohol. This theory suggests that when a person consumes alcohol, his cognitive abilities to process and discriminate between stimuli or cues to behavior begin to decrease. This cognitive impairment causes the person to focus on the most important cues and ignore others, making them ''myopic'' (8-10). The same has been shown for other psychotropic drugs that impair cognition (10).

In Latin America, approximately 1.4 million people are infected with HIV; more than half of the cases are in Brazil (11) and due to sexual intercourse (12). Among youth (between 13 and 19 years old), the number of AIDS cases is higher among females than males in Brazil, which is different from the gender ratio in other age groups. Governmental data suggest that despite having high knowledge about STD/HIV, youth are the only age group that shows a trend toward increased HIV infection. Among girls, almost the totality of infections were due to heterosexual intercourse (13).

Because most current studies were derived from data collected among adults and young adults in developed countries, there is an interest in studying the level of exposure to sexually transmitted diseases in adolescence and its association with patterns of alcohol/other drug use in a middle-income country, such as Brazil (14). This study tested the hypothesis that risky sexual behaviors among adolescents are associated with alcohol and other drug use and therefore, aimed to describe the socio-demographic characteristics of unsafe sex among high school students in Brazil.

■ METHODS

Study design and sample selection

The data were from a cross-sectional survey of school-attending youths in all 27 Brazilian state capitals; the classroom survey data were collected in 2010 from a sample of the cities' private and public schools. The study's target population was designed as a representative multistage probabilistic sample of high school students (10th to 12th grade) in these schools, with a two-step random selection process. A total of 789 schools participated in this study, with a school response rate of 86%. The sample size considered a maximum relative error of 10% and a 95% confidence interval for a variation of 50%. The student response rate was 79.2% (20.5% were absent on the day of the survey, and 0.3% refused to participate). Ninety-eight questionnaires were excluded from the analysis for having a positive answer for a fictitious drug. The present study was limited to high school students between 13 and 18 years of age (n = 17,371).

Approximately 2% of the participants had missing or invalid responses to the key study variable (sexual intercourse), resulting in a total sample of 16,998 subjects for the bivariate analysis (Table 1). Considering the missing data for the independent variables (6%), the effective sample size with useable data for logistic regressions was 16,202 participants (Table 2). Logistic regressions for non-condom use sexual intercourse considered only those who had sex during the month prior to the survey (n = 3,551).

Assessment Plan

Anonymous standardized paper and pencil questionnaire data were gathered by a trained team of interviewers who worked in the classroom without a teacher present. A questionnaire with closed-form questions adapted from standardized World Health Organization items (15) and the European School Survey Project on Alcohol and Other Drugs (ESPAD) questionnaire (16) was used. On average, it took 40 minutes for the students to complete the questionnaire.

The protocol was reviewed and approved by the UNIFESP Research Ethics Committee (Protocol #0348/08), with provisions for participants to participate anonymously, to decline to participate, to leave questions unanswered, or to interrupt their participation at any time.

Measures

Key Response Variables. The key response variables in this study were as follows: 1) sexual intercourse during the past month (past 30 days) and 2) sexual intercourse without condom use during the past month (past 30 days). The students answered if they had sexual intercourse in the month prior to the survey and if they had sexual intercourse without condom use in the month prior to the survey (yes or no answer). Questions about risk behavior were based on the CDC-YRBSS (Centers for Disease Control [CDC] and Prevention Youth Risk Behavior Surveillance System).

Covariates under study

The covariates of central interest were drug use in the same period of time (past 30 days) as the sexual intercourse. Questions about alcohol use, tobacco smoking, and illegal drug use were based on the World Health Organization drug use survey for students and had the following structure: ''During the previous month, that is, in the last 30 days, did you drink any alcoholic beverage?'' For the illegal drug variable, we considered at least one use in the past month of at least one of the following drugs: cocaine, crack, marijuana, inhalants, ecstasy, or LSD. Binge drinking (BD) in the past month was defined as at least one episode of consumption of five or more servings of alcoholic beverages on the same occasion, as used in the ESPAD survey (16). A serving was defined as a 5 oz glass of wine, a 12 oz can of beer, or a 1.5 oz shot of liquor, and the equivalence examples were drawn on the questionnaire to facilitate student understanding.

Socio-demographic variables included gender, age, type of school (public or private), and socioeconomic status (SES). SES was evaluated in relation to a highly standardized survey assessment of socio-economic status known as the ABEP index (Associação Brasileira de Empresas de Pesquisa or the Brazilian Association of Research Agencies). The ABEP index (17) is based on the educational level of the head of the household, possession of various types of household goods (e.g., television sets), and the number of housekeepers. This scale was used to sort participants into standardized subgroups labeled from A to E (in which A was the highest economic group). Strata D and E were grouped for analysis due to the low prevalence of SES E students.

Statistical analysis

Analyses were conducted on data weighted to correct for unequal probabilities of selection into the sample. The

CLINICS 2013;68(4):489-494

Drug use and unprotected sex among adolescents
Sanchez ZM et al.

Table 1 - Sociodemographic characteristics and drug use characteristics according to sexual intercourse status during the month prior to the survey among high school students in Brazil. Among those who had engaged in sexual intercourse in the month prior to the survey, the same variables are described for the group that used a condom and the group that had unsafe sex.

		Recent sexual intercourse (N = 16,998)							Recent sexual intercourse and condom use[a] (N = 4,483)						
		No			Yes				With Condom			Non-Condom			
		N	%	SE	N	%	SE	p-value	N	%	SE	N	%	SE	p-value
Gender	female	7330	58.4	0.7	2112	49.7	0.1	<0.0001	1007	42.1	1.6	1095	60.2	1.5	<0.0001
	male	5144	41.6	0.7	2377	50.3	0.1		1616	57.9	1.6	753	39.8	1.5	
Age	13 to 15	5425	43.7	1.7	985	20.9	1.3	<0.0001	640	22.9	1.5	341	18.3	1.6	0.011
	16 to 18	7072	56.3	1.7	3515	79.1	1.3		1988	77.1	1.5	1513	81.7	1.6	
Socioeconomic Status (SES)	A	2209	13.3	1.4	719	12.2	1.1	0.75	461	13.4	1.4	255	10.7	1.2	0.001
	B	4873	43.7	1.1	1650	44.2	1.5		970	46.7	2.1	673	40.5	1.9	
	C	3307	38.6	1.2	1271	39.1	1.1		702	36.2	1.9	565	43.1	1.9	
	D/E	428	4.4	0.3	163	4.5	0.3		82	3.6	0.5	81	5.7	7.8	
Brazilian Region	North	2649	11.1	1.1	1003	10.3	0.8	0.01	635	11.4	0.9	363	8.9	1.0	0.21
	Northeast	4819	28.3	1.7	1568	25.1	1.5		890	23.9	1.6	673	26.8	2.0	
	Southeast	1943	41.4	2.1	790	46.3	2.2		437	46.2	2.3	348	46.4	2.8	
	South	1082	7.2	0.9	465	7.9	0.9		270	8.2	1.0	193	7.6	1.0	
	Middle West	2004	12.0	1.0	675	10.4	0.9		396	10.4	1.0	278	10.3	0.9	
Type of School	private	5651	24.5	1.7	1532	17.5	1.5	<0.0001	941	18.0	1.6	585	16.9	1.9	0.51
	public	6846	75.5	1.7	2969	82.5	1.5		1687	82.0	1.6	1270	83.1	1.9	
Recent Tobacco[b]	yes	566	4.8	0.3	724	16.5	1.1	<0.0001	368	14.3	1.0	354	19.3	1.7	0.001
	no	11889	95.2	0.3	3748	83.5	1.1		2245	85.7	1.0	1487	80.7	1.7	
Recent Binge[b]	yes	1697	13.4	0.7	1581	37.2	1.4	<0.0001	884	34.6	1.6	696	40.9	1.8	0.002
	no	10525	86.6	0.7	2634	62.8	1.4		1581	65.4	1.6	1036	59.1	1.8	
Recent Alcohol[b]	yes	3346	26.4	0.9	2344	53.6	1.3	<0.0001	1319	51.2	1.5	1022	57.1	1.9	0.002
	no	8993	73.6	0.9	2035	46.4	1.3		1240	48.8	1.5	780	42.9	1.9	
Recent Illegal Drug Use[b]	yes	571	4.2	0.3	653	14.5	0.8	<0.0001	342	12.8	0.9	308	16.8	1.2	0.004
	no	11925	95.8	0.3	3848	85.5	0.8		2286	87.2	0.9	1547	83.2	1.2	
Total		12497	70.6	0.7	4501	29.4	0.7		2628	57.6	1.3	1855	42.4	1.3	

[a] only among those who had sex during the past month; [b] recent use refers to use during the 30 days prior to the survey.

complex survey design took into account the city and type of school, the school as the primary sampling unit, the expansion weight, and the final probability of drawing the student who answered the questionnaire. The outcome variable of interest was unsafe sexual intercourse during the past month. The independent variables included SES, type of school, age, gender, and drug use in the same period of the past month (binge drinking, tobacco use, alcohol use, and illegal drug use). We described sexually active students' characteristics and the characteristics of those reporting sexual intercourse without condom use by weighted proportions and crude odds ratios from logistic regressions. All analyses were controlled for age, sex, and type of school.

Analyses were performed using Stata Version 11 (Stata Statistical Software Release 11, StataCorp. 2009, College Station, Texas, USA) with svyset procedures to determine variance estimation under the complex sample survey mode in these regression models and estimate 95% confidence intervals (CI). The results are presented as weighted proportions (wgt%), crude odds ratios (cORs), adjusted odds ratios (aORs), and 95% CIs.

■ **RESULTS**

Approximately one third of the high school students reported having sex in the month prior to the survey, and 79% (SE 1.3%) of them were 16 to 18 years old (Table 1).

Approximately one third of adolescents who had recent sexual intercourse also had recently used drugs (37.2% engaged in binge drinking, 16.5% had smoked tobacco, and 14.5% had used illegal drugs).

Among the adolescents who had sex during the past 30 days, 43% (SE 1.3%) had not used a condom. This unsafe behavior was more prevalent among girls (60.2%, SE 1.5%), participants aged 16 to 18 years old (81.7%, SE 1.6%), and the students studying in public schools (83.1%, SE 1.9%).

Bivariate analyses showed that recent binge drinking and alcohol, tobacco, and illegal drug use were more prevalent among those participants who had recent sexual intercourse without a condom compared with those who had used a condom. Binge drinking was reported by 40.9% of the group who had unsafe sex and by 34.6% of the group who used a condom (p = 0.002).

Sexual intercourse was more prevalent among boys (aOR = 1.32, 95% CI 1.18-1.48), but unsafe sexual intercourse (non-condom use) was more prevalent among girls (aOR = 2.21, 95% CI 1.79-2.73).

Older age and lower socioeconomic status were directly associated with non-condom use. An increase of one year of age increased the odds of engaging in unsafe sex by 17%. A decrease of one level of SES (considering the four SES groups) increased the odds of engaging in a sexual intercourse with a condom by 21%.

Binge drinking and illegal drug use were independently associated with unsafe sex, even when controlling for obvious confounders (age, gender, and SES). Adolescents who had non-condom sex were 32% and 43% more likely to engage in binge drinking and illegal drug use, respectively, in the same period of time (past 30 days) (Table 2).

Any recent sexual intercourse was associated with any drug use, age, and gender (p<0.0001) but was not associated

Drug use and unprotected sex among adolescents
Sanchez ZM et al.

CLINICS 2013;68(4):489-494

Table 2 - Logistic regression estimates for sexual intercourse during the month prior to the survey and sexual intercourse during the month prior to the survey without condom use among high school students in Brazil according to sociodemographic characteristics and drug use (crude and adjusted odds ratios).

	Recent sexual intercourse (N = 16,202)						Sexual intercourse without condom use[b] (N = 3,551)					
	cOR	IC	*p*-value	aOR	IC	*p*-value	cOR	IC	*p*-value	aOR	IC	*p*-value
Male	1.42	1.27;1.58	<0.0001	1.32	1.18;1.48	<0.0001	0.48	0.40;0.57	<0.0001	0.45	0.36;0.55	<0.0001
Age	1.65	1.55;1.74	<0.0001	1.52	1.43;1.61	<0.0001	1.12	1.04;1.21	0.002	1.17	1.07;1.28	0.001
SES[a]	1.03	0.95;1.11	0.40	.	.	.	1.28	1.12;1.44	<0.0001	1.21	1.05;1.39	0.006
Brazilian region	1.01	0.97;1.06	0.43	.	.	.	1.01	0.95;1.07	0.69	.	.	.
Public school	1.52	1.30;1.78	<0.0001	1.59	1.36;1.87	<0.0001	1.07	0.86;1.34	0.51	.	.	.
Recent tobacco	3.88	3.27;4.61	<0.0001	1.69	1.33;2.13	<0.0001	1.43	1.15;1.77	0.001	.	.	.
Recent binge	3.82	3.29;4.43	<0.0001	1.73	1.39;2.14	<0.0001	1.31	1.10;1.55	0.002	1.32	1.07;1.63	0.008
Recent alcohol	3.22	2.88;3.61	<0.0001	1.72	1.46;2.03	<0.0001	1.27	1.08;1.48	0.003	.	.	.
Recent illegal drug	3.89	3.31;4.56	<0.0001	2.02	1.69;2.03	<0.0001	1.37	1.10;1.70	0.004	1.43	1.03;1.90	0.012

[a]reference group for socioeconomic status was the highest level (A). [b] reference group was participants who reported sex with condom use.

with SES ($p = 0.40$) or the five Brazilian geo-economic regions ($p = 0.43$). Adjusted logistic regression for recent sexual intercourse showed that adolescents who had sex in the month prior to the survey were twice as likely to also have used illegal drugs in the same period and were approximately 70% more likely to have used alcohol (any alcohol use and binge drinking) and tobacco (see Table 2).

■ DISCUSSION

The main findings of this study showed that most students who had sexual intercourse in the 30 days prior to the survey also used legal or illegal drugs in the same period, and nearly half of these students had not used a condom. Most of the students who engaged in unsafe sex were older girls from lower SES families. Adolescents who used any illegal drugs or engaged in binge drinking during the past month were less likely to use a condom during sexual intercourse in the same period prior to the survey. Although our study did not evaluate the concomitant use of alcohol and other drugs at the time of the unprotected sex, these behaviors were associated and reported by the same subjects during the same time period.

Unprotected sex is not a problem only among Brazilian adolescents. Recent data from a biennial National Survey on Youth Risk Behavior in the US showed less alarming but not harmless numbers. Data for the period of 1991 to 2011 indicated that recent condom use among students currently having sexual intercourse increased from 46.2% in 1991 to 60.2% in 2011 for both genders. However, 40% of the adolescents (both boys and girls) were still engaging in recent sexual intercourse without using condoms (18). In Spain, contrary to what we found in our study, boys were more likely not to use condoms than girls; 82% of the adolescent boys who had ever had sexual intercourse reported recent risky sexual behavior (multiple partners or non-condom use) compared with 62% of the girls. The two strongest predictors for risky sexual behaviors were country of origin (not Spain) and recent alcohol use among boys or recent use of cannabis among girls (19).

However, it is important to note that studies about condom use and its association with drug use among adolescents in Latin America are not common. A national survey among high school students in Argentina showed a less worrisome situation than observed in the present study. According to Linetzky et al. (20), among students who had

sexual intercourse during the 12 months prior to the survey, 81% had used a condom, but only 43% said they had always used a condom. No data on drug use were available. In Brazil, among high school students in Minas Gerais, girls were less likely than boys to use condoms consistently, regardless of the nature of their relationships. Non-condom use and illegal drug use were only significantly associated among boys who had recently used illegal drugs (21).

Dahl (22) noted that during puberty, changes occur in the neuronal system responsible for emotions and motivations, which facilitates the emergence of risk taking behaviors. At this stage, adolescents seek new experiences that generate pleasure, but the feeling of omnipotence can trigger a lack of awareness of the consequences of their actions.

The association between drug use and sexual intercourse might also be a strategy for the facilitation of the sexual act. For example, a study among British young adults showed that alcohol, marijuana, ecstasy, and cocaine were used to stimulate arousal during sexual intercourse. Moreover, in this British study, early alcohol use was associated with early sexual activity onset, primarily among girls (5). Thus, the fact that adolescents who use alcohol/drugs are more likely to engage in unsafe sex can be explained by both pharmacological and behavioral issues. The Alcohol Myopia Theory (8) appears to be appropriate and to explain the unsafe sex that occurs after the use of psychotropic drugs taken to facilitate a sexual encounter. In contrast, the risk-taking behavior theory might explain why the same group of youth expose themselves to different risks.

In our study, we found that girls were more exposed to unprotected sex than boys, and this result could explain why there is a larger proportion of adolescent girls in Brazil infected with HIV than boys in the same age group (13). Gender differences in the prevalence of unsafe sex have been described before in studies focusing on US high school students. According to Johnston et al. (23), girls are more engaged in monogamous dating and felt more secure about STD/AIDS. However, another hypothesis suggests that being in love and using alcohol/drugs blinded these girls to the risk of unprotected sex, even when they knew of the possibility of contracting HIV (24). Bralock and Koniak (25) point to the fact that female adolescents were willing to concede to unprotected sexual intercourse with a boy they loved, showing that being in love was a risk factor for STD transmission.

CLINICS 2013;68(4):489-494

Drug use and unprotected sex among adolescents
Sanchez ZM et al.

It is important to note that these girls may have been having unprotected sex with older boys/men who were no longer in high school and therefore were not detected by our study (which would explain the gender differences found among high school students). Late-adolescent girls usually engage in sex with older boys/men (26). Another possible explanation for this behavior being more prevalent among women may be the use of contraceptives. These girls may believe that once protected against unwanted pregnancy, there is no need to use a condom, culminating in the practice of unsafe sex and increasing the risk for STDs/HIV. This method can be very useful for preventing pregnancy during adolescence; however, contraception does not prevent STDs (27).

In our national sample, low SES increased the risk for unsafe sex but was not associated with sexual activity. Conversely, (28) among Canadian high school students, a lower SES was associated with sexual activity but not risky sexual behaviors. SES may also play a role as a moderator for condom use. In a survey of adolescents from low-income areas in Mexico, the odds of adolescent condom use were higher in larger urban areas only among adolescents in the lowest SES levels. The results suggest that condom use is related to urbanicity but moderated by SES (29).

The spread of HIV has become a serious public health concern and must be considered among adolescents, as adolescence is the stage of life when risky sexual behaviors start (13,23). According to Catalano et al. (30), alcohol, tobacco, and illegal drug use and unsafe sex were responsible for the burden of adolescent mortality and morbidity worldwide. However, these risky behaviors are preventable, and it is time for the policy makers from low and middle income countries to incorporate youth intervention strategies into public policy.

School-age youth need education and prevention programs that are incorporated into the larger context of school health education curricula. Specific interventions should focus on improving the decision-making skills of adolescents, including techniques to negotiate safer sex behaviors among girls. However, according to a recent systematic review on interventions to prevent substance use and risky sexual behavior in young people (31), the interventions that addressed multiple domains of risk (individual and peer, family, school, and community) and protective factors against risky behavior were more promising than programs that addressed just one domain (school, individual, or family). However, there are relatively few studies on interventions to reduce the association between substance use and sexual risk. The interventions described in this review showed mixed results, with programs impacting some measures but not others or having an inconsistent effect across genders and no long-term effects. These findings suggest that there is an urgent need for developing culturally tailored intervention programs aimed at reducing the risk behaviors identified in this study.

Despite the relevance of our findings and the implications for prevention among adolescents, some limitations must be mentioned. Because a self-report questionnaire was used, the questions were subject to interpretation by the participants and to a possible information bias. However, the anonymous nature of the survey and the absence of the teacher in the classroom should have helped promote response validity. Additionally, the question about a fictitious drug allowed us to drop the questionnaires with

shown biased information. Some degree of non-participation (especially because of absence on the day of the survey) and missing data excluded some students from the analysis. However, the levels of participation were larger than those obtained in the US Monitoring the Future study (32), considering that almost all of the students that were invited to participate agreed to participate. Because this study did not collect information on variables such as school policies against alcohol consumption, other drug use, and sexual behaviors, it is not possible to control the analysis for the influence of school prevention programs on binge drinking, other drug use, and unsafe sex. Furthermore, this was a cross-sectional survey; therefore, while the variables analyzed were associated with the practice of unsafe sex, it was not possible for us to establish causal relationships. In addition, we did not measure the propensity of the students for risk-taking behaviors (such as impulsivity; for example, highly impulsive youth might bond and mingle with other highly impulsive youth and thus engage more frequently in alcohol and other drug use and in unsafe sex practices). Moreover, we did not investigate sexual preferences that could lead to different urges or reasons for condom use.

Nearly half of the sexually active high school students in Brazil had not used a condom during recent sexual intercourse. While the overall prevalence of sexual intercourse was higher among boys, unsafe sexual intercourse was more prevalent among girls. A lower socioeconomic status was directly associated with non-condom use. This study offers directions for prevention programs by suggesting that recent unsafe sexual behavior (non-condom use) is associated with recent binge drinking and illegal drug use. The authors suggest that school prevention programs must include drug use and sexuality topics simultaneously, as both risk-taking behaviors are prevalent among high school students and occurred during the same month.

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■ AUTHOR CONTRIBUTIONS

Sanchez ZM wrote the first draft of the manuscript and performed the statistical analyses. Cruz JI performed the literature search and wrote the first draft of the discussion. Nappo SA critically revised the manuscript for important intellectual content. Carlini EA and Carlini CM substantially contributed to the conception, design, and acquisition of the student survey data. Martins SS supervised the statistical analyses and writing process. All of the authors approved the final version of the manuscript.

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Drug use and unprotected sex among adolescents
Sanchez ZM et al.

CLINICS 2013;68(4):489-494

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